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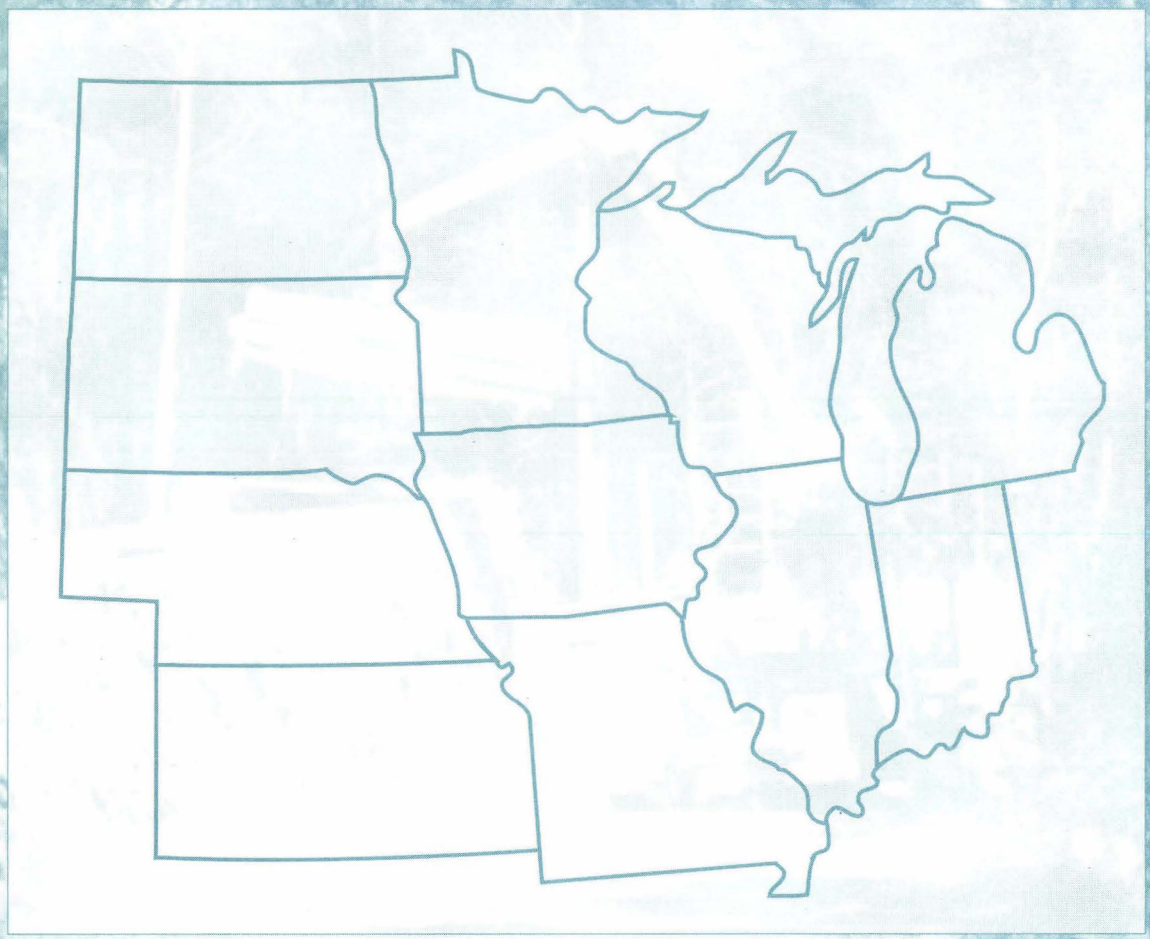
Pulpwood Production in the North-Central Region, 2003

Ronald J. Piva



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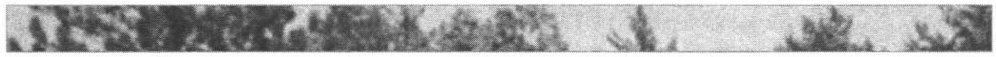

Pulpwood Production in the North–Central Region, 2003

Ronald J. Piva

NOTE: This report includes all primary products made from reconstituted wood fiber. In addition to wood pulp, this includes particleboard and engineered lumber products made from chips, shavings, wafers, flakes, strands, and sawdust. This report presents the production of the raw fiber material delivered to mills. Thus, these data report only that portion of the timber harvest used as raw material and do not necessarily reflect the volume of growing stock harvested.

About the Author:

Ronald J. Piva, Forester, received a B.S. in forest management from the University of Missouri-Columbia. He joined the Forest Service in 1987 and has been working with the North Central Station's Forest Inventory and Analysis unit since.

Pulpwood constitutes more than half the industrial timber products harvested annually in the Lake States (Michigan, Minnesota, and Wisconsin) and is an important product in the Central States (Illinois, Indiana, Iowa, and Missouri) and the Plains States (Kansas, Nebraska, North Dakota, and South Dakota).

Current detailed information about pulpwood production[1] is necessary for intelligent planning and decisionmaking in wood procurement, forest resource management, forest industry development, and scientific studies.

Since 1979, logs, bolts, and wood residue used in manufacturing flakeboard, waferboard, oriented strandboard, and medium density fiberboard have been included in this annual report. Engineered lumber was first included in this report in 1992. Together, these products are called particleboard, and all mills manufacturing these boards are called particleboard mills in this report. Wood used at particleboard mills is identical or nearly identical to wood used at pulp mills; therefore, including this wood in our study provides a more accurate estimate of demand for pulpwood-like material.

Particleboard mills were in their infancy before 1979 and used primarily aspen and wood residue. Therefore, data for these mills do not distort roundwood use trends for other species or preclude comparing 2003 survey results with those of 1978 and previous years.

Pulp and particleboard mills using timber from the North Central States in 2003 reported their pulpwood receipts[2] by species group and county of origin.

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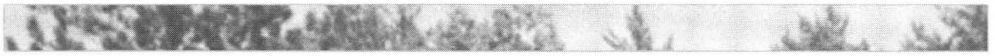
[1] *Pulpwood production, determined from mill receipts, is the annual volume of pulpwood cut, plus the annual wood residue volume produced by sawmills, veneer mills, etc. used for pulp, particleboard, waferboard, oriented strandboard, medium density fiberboard, or engineered lumber.*

[2] *Pulpwood receipts are the volumes of wood received by mills in a specific State or region, regardless of the geographic source.*



This report presents the results of the survey, analyzes the data, compares results with those of 2002 and earlier years, and discusses trends in pulpwood production and use.

The Lake States, Central States, and Plains States are discussed separately because the timber types in each area are different, the flow of wood between the areas is nominal, and more detailed data on pulpwood production and receipts in the Central and Plains States might reveal the operations of individual mills. This is the 45th annual report of the pulpwood harvest in Lake States counties, the 44th annual report of the Central States harvest, and the 11th report of the pulpwood harvest in the Plains States.

Several mills purchase their pulpwood based on weight rather than volume. Factors used to convert green tons of pulpwood to standard cord equivalents are shown in the appendix.

When new surveys are completed, errors and omissions from previous surveys are corrected. As a result of our ongoing efforts to improve the survey's efficiency and reliability, changes may have been made to the previous survey's data. All comparisons and analysis in this report are based on the reprocessed data from earlier surveys, which may not match earlier published data.

LAKE STATES

PRODUCTION

- Pulpwood production in the Lake States rose from 9.4 million cords[3] in 2002 to 9.5 million cords in 2003, an increase of only 1 percent. Overall, 90 percent came from roundwood (including chips from roundwood) and 10 percent came from the residue[4] of wood-using plants (fig. 1).

- Hardwood material—both roundwood and residues—constituted 77 percent of the total pulpwood production.

- Aspen remained the dominant species harvested for pulpwood in the Lake States in 2003, with 3.6 million cords, or 43 percent of the total roundwood. Other important species harvested for pulpwood in 2003 were soft maple (931 thousand cords), hard maple (782 thousand cords), white birch (554 thousand cords), jack pine (428 thousand cords), and red pine (348 thousand cords) (table 1).

- Softwood roundwood production increased by 2 percent, from 1.6 million cords in 2002 to 1.7 million cords in 2003. Pulpwood production from softwood residues increased by 6 percent to 454 thousand cords in 2003 (fig. 2).

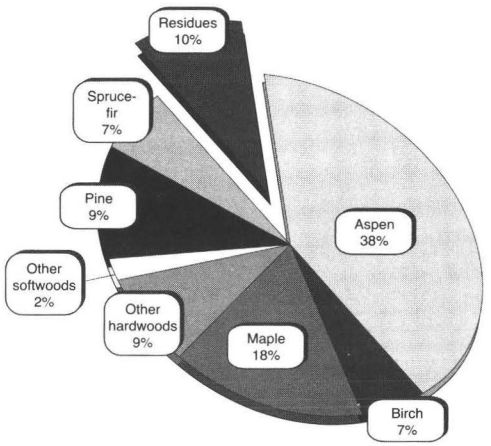


Figure 1.—*Lake States pulpwood production by species group and residues, 2003.*

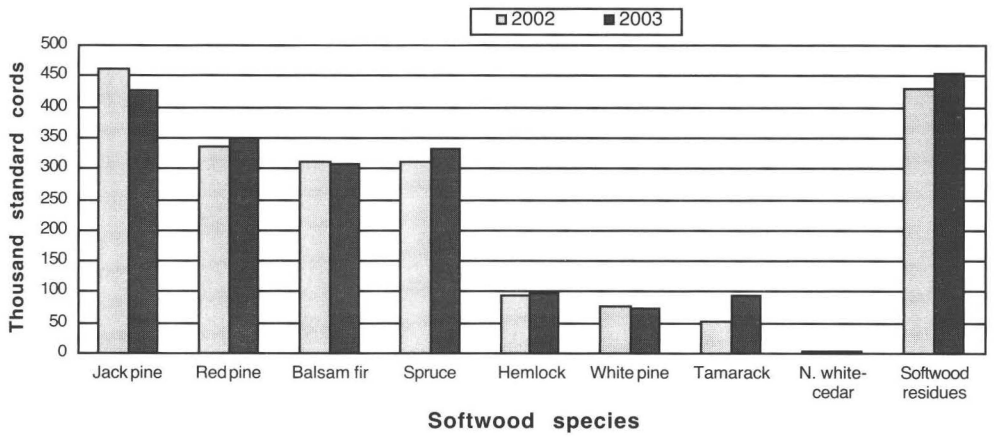


Figure 2.—*Softwood pulpwood production in the Lake States, 2002-2003.*

[3] *All references to cords are in standard cords. A standard cord is 128 cubic feet of wood, bark, and air space.*

[4] *Residue is the byproduct from sawmills, veneer mills, cooperage mills, and other wood-using mills that is used for pulping and particleboard. Residue includes slabs, edgings, veneer cores, sawdust, fines, woodflour, and chips manufactured from slabs, edgings, and veneer cores.*

- Hardwood roundwood production remained at the 2002 level of 6.8 million cords. From 2002 to 2003, pulpwood production from hardwood residue increased by 3 percent (fig. 3).

- Whole-tree chip[5] (WTC) production, at 561 thousand cords, made up 6 percent of the total pulpwood production in the Lake States in 2003. Compared to 2002 production levels, hardwood WTC production in 2003 decreased by almost 20 percent while softwood WTC production decreased by only 1 percent (fig. 4).

- Aspen was the predominant species used in WTC in 2003 with 211 thousand cords or 38 percent of the total WTC production. Jack pine, at 67 thousand cords, was the predominant softwood species used in WTC in 2003 and accounted for 12 percent of the total WTC production.

- Michigan was the major producer of WTC in the Lake States in 2003 with 410 thousand cords (73 percent of the WTC production) (fig. 5).

Figure 3.—*Hardwood pulpwood production in the Lake States, 2002-2003.*

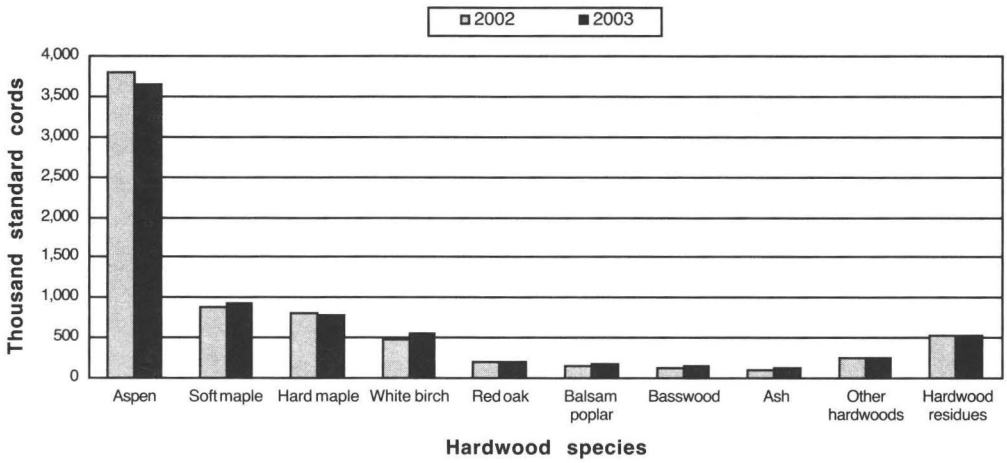
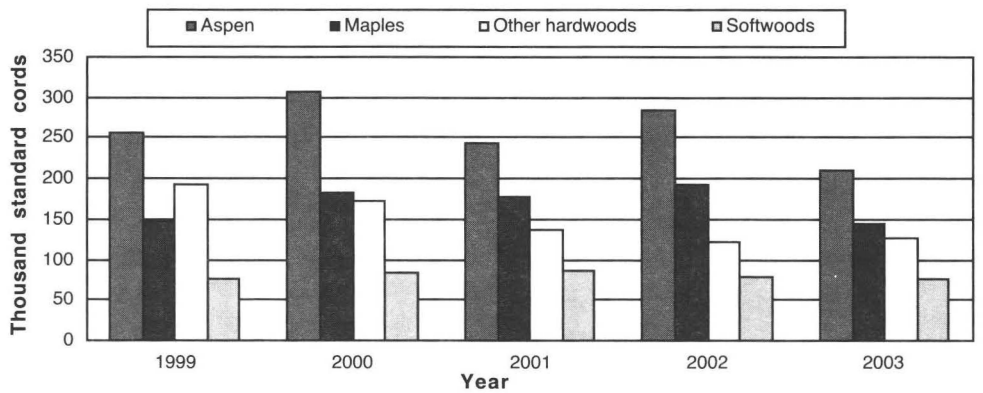


Figure 4.—*Whole-tree chip production in the Lake States, 1999-2003.*



[5] *Pulpwood produced from chipping entire trees (all portions of the trees above ground, except the stumps).*

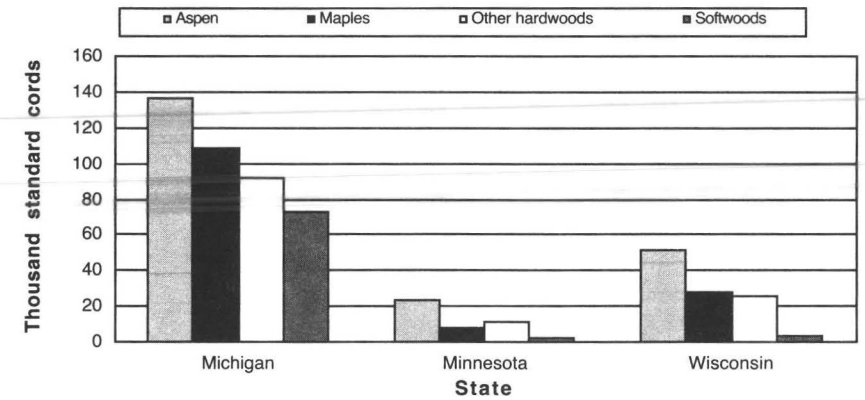


Figure 5.—*Whole-tree chip production by State in the Lake States, 2003.*

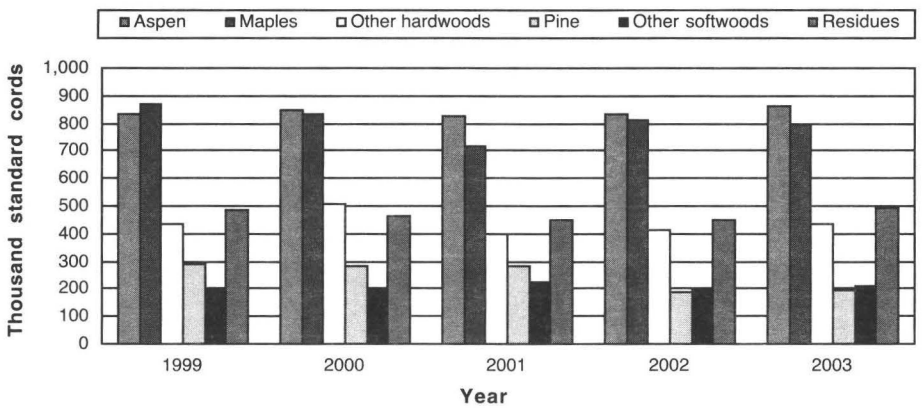


Figure 6.—*Michigan pulpwood production by species group and residues, 1999-2003.*

Michigan

- The total output of wood material for pulpwood production in Michigan increased by 3 percent, from 2.9 million cords in 2002 to 3.0 million cords in 2003 (fig. 6 and table 2).

- Roundwood production for pulpwood increased by 2 percent between 2002 and 2003 (table 3).

- The Western Upper Peninsula remained the top pulpwood-producing region in the State in 2003 with 38 percent of the total roundwood harvested (fig. 7 and tables 4 and 5).

- From 2002 to 2003, roundwood pulpwood production increased by 12 percent in the Southern Lower Peninsula, by 5 percent in the Northern Lower Peninsula, and by 2 percent in the Western Upper Peninsula; it decreased by 4 percent in the Eastern Upper Peninsula.

- The production of pulpwood from residues generated in Michigan increased by 9 percent, from 448 thousand cords in 2002 to 490 thousand cords in 2003.

Minnesota

- Pulpwood production decreased by 2 percent between 2002 and 2003, a decrease of 57 thousand cords (fig. 8).

- Hardwoods accounted for over three-fourths of the total pulpwood produced in 2003.

- Ninety-six percent of the pulpwood produced in Minnesota in 2003 came from roundwood.

Figure 7.—*Michigan roundwood pulpwood production by Forest Survey Unit and species groups, 2003.*

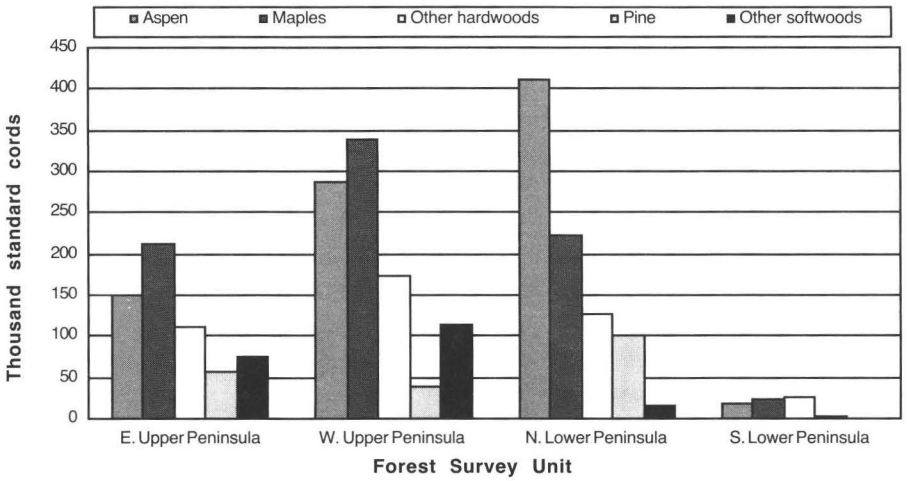


Figure 8.—*Minnesota pulpwood production by species group and residues, 1999-2003.*

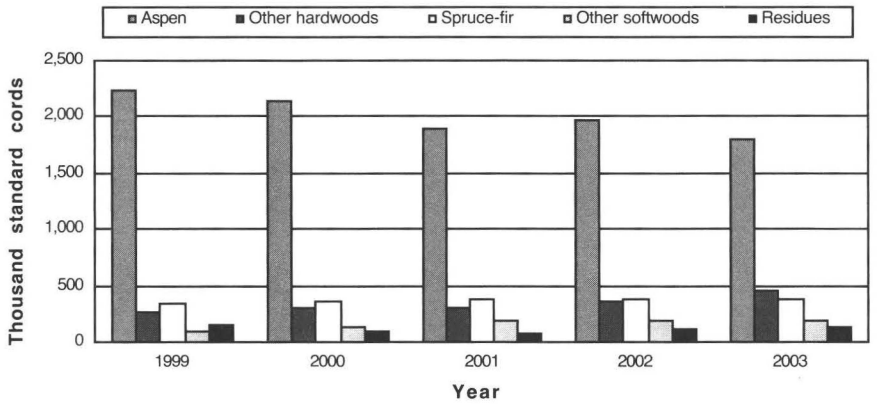
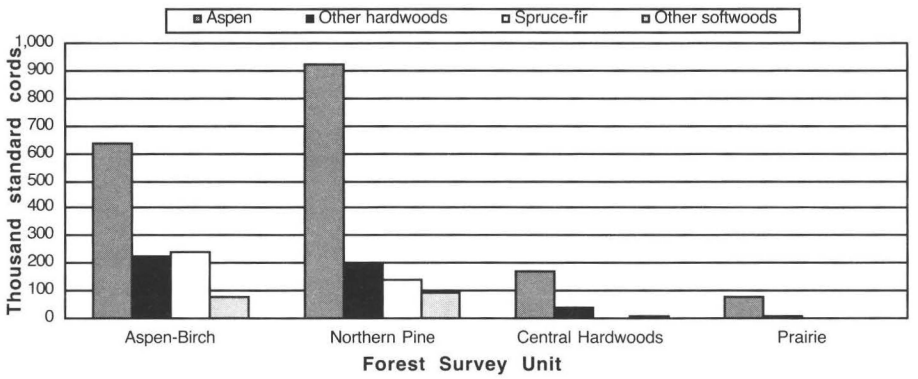


Figure 9.—*Minnesota roundwood pulpwood production by Forest Survey Unit and species group, 2003.*



- The Northern Pine and the Aspen-Birch Forest Survey Units were the top pulpwood-producing roundwood regions in the State in 2003 with 1.3 million cords and 1.2 million cords, respectively (fig. 9 and table 6).
- Aspen accounted for 63 percent of all the roundwood harvested for pulpwood in Minnesota in 2003.
- From 2002 to 2003, residues generated in Minnesota and used for pulpwood production increased by 19 percent.

Wisconsin

- Pulpwood production in Wisconsin increased by 64 thousand cords between 2002 and 2003, an increase of 2 percent (fig. 10).
- Hardwood material accounted for 77 percent of the total pulpwood production in 2003.
- Roundwood harvested for pulpwood accounted for almost 90 percent of the pulpwood produced in 2003.
- The Northwestern Forest Survey Unit remained the top producer of roundwood for pulping in the State with 1.3 million cords (fig. 11 and table 7).
- Wood residues produced in Wisconsin and used for pulpwood production decreased by 6 percent between 2002 and 2003.

Harvesting Intensity

- In the following figures, the distribution of the harvest is shown in two ways: first, the amount of pulpwood cut relative to the growing-stock volume in each of five major pulpwood species (fig. 12); second, the amount of pulpwood relative to commercial timberland area (fig. 13).

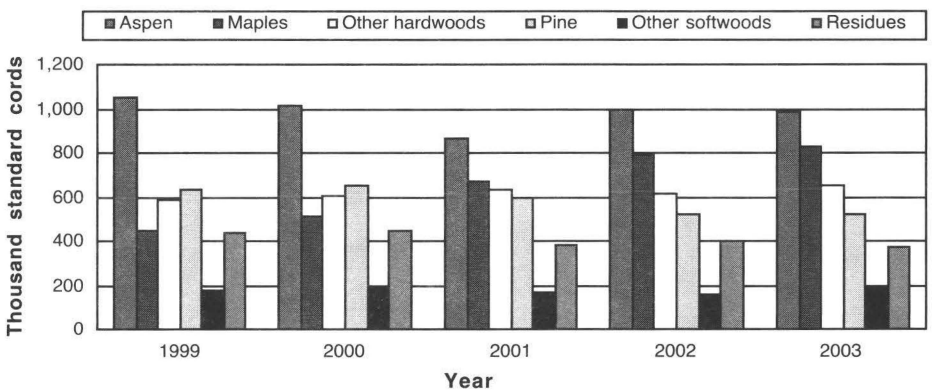


Figure 10.—*Wisconsin pulpwood production by species group and residues, 1999-2003.*

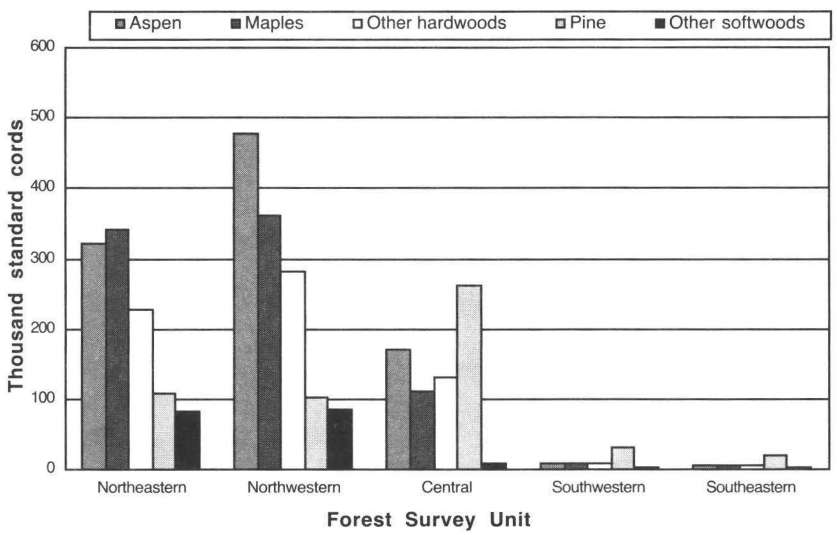
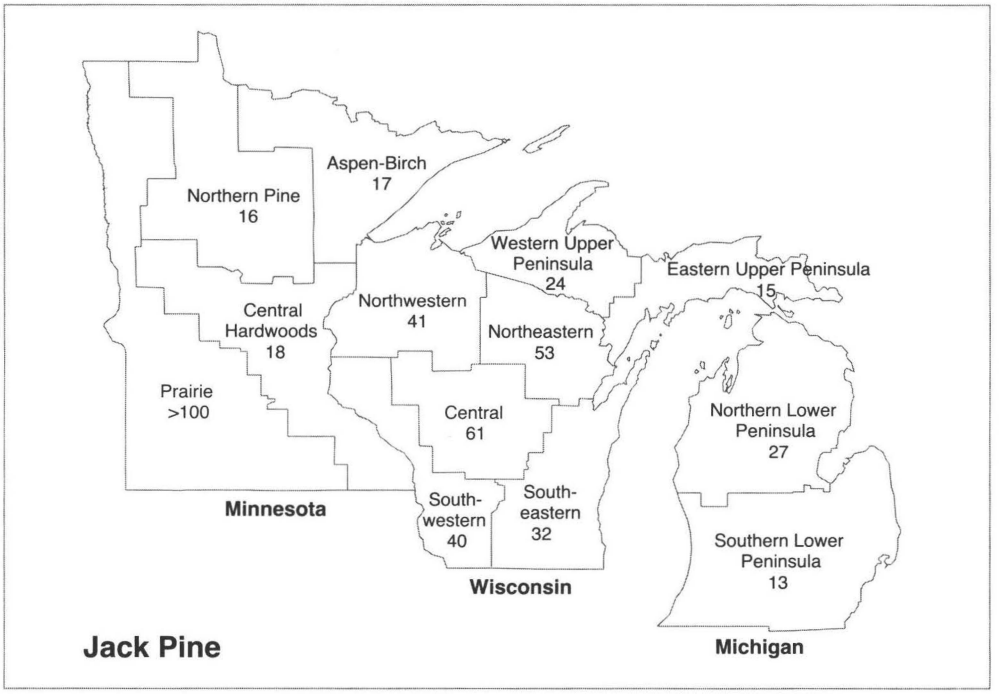
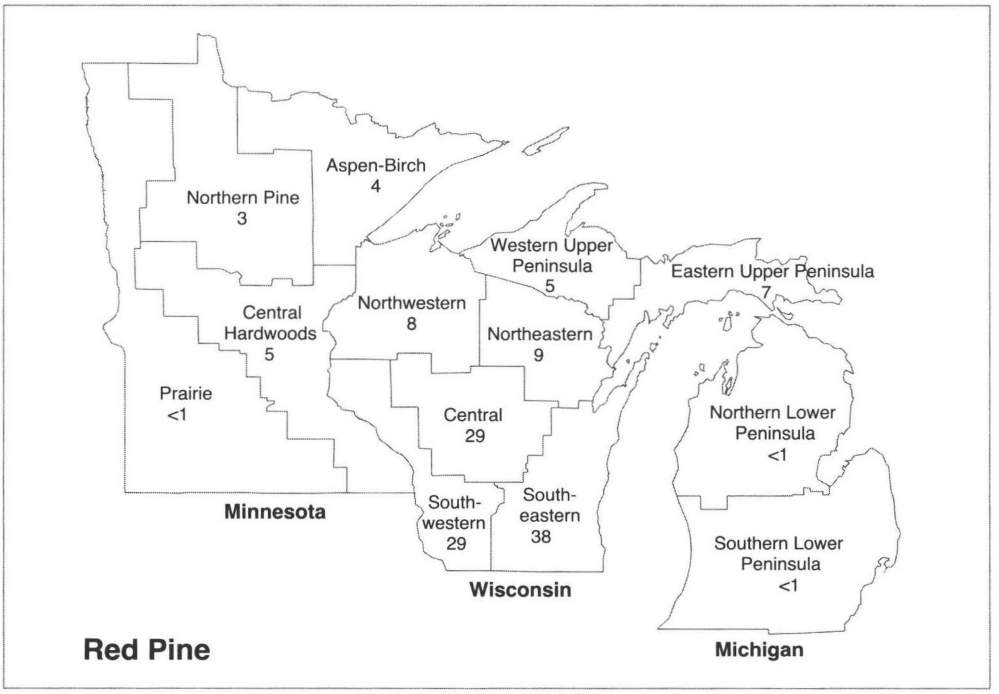
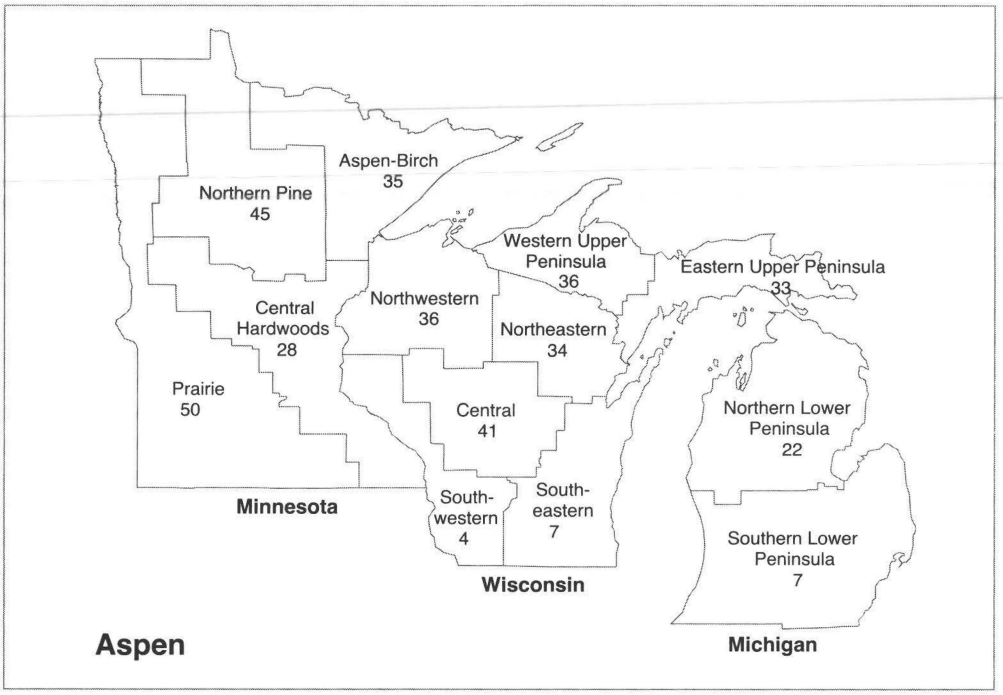


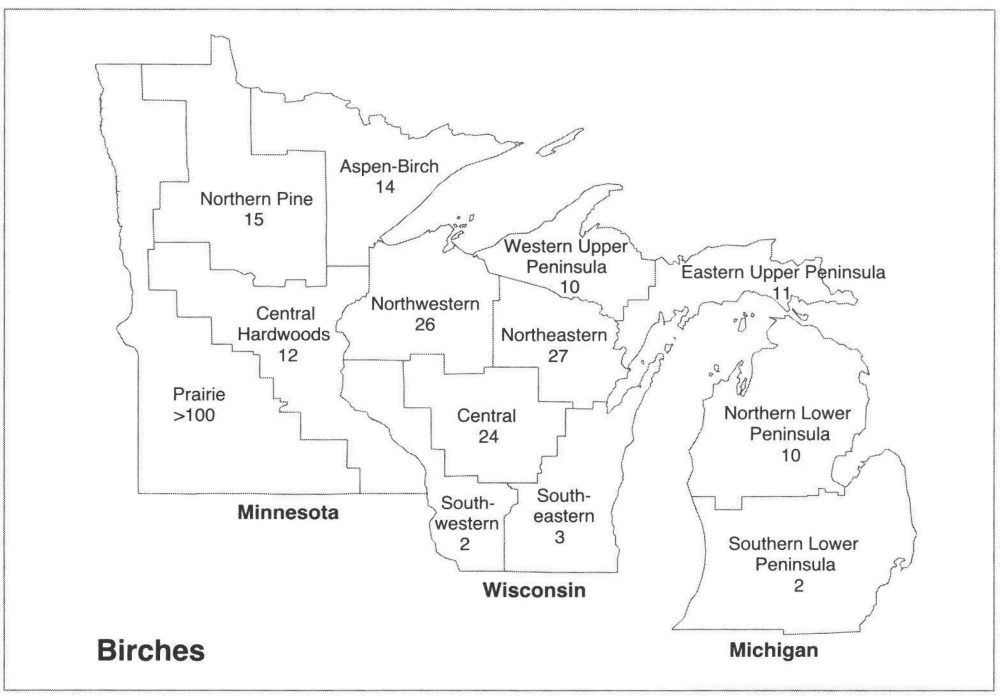
Figure 11.—*Wisconsin roundwood pulpwood production by Forest Survey Unit and species group, 2003.*

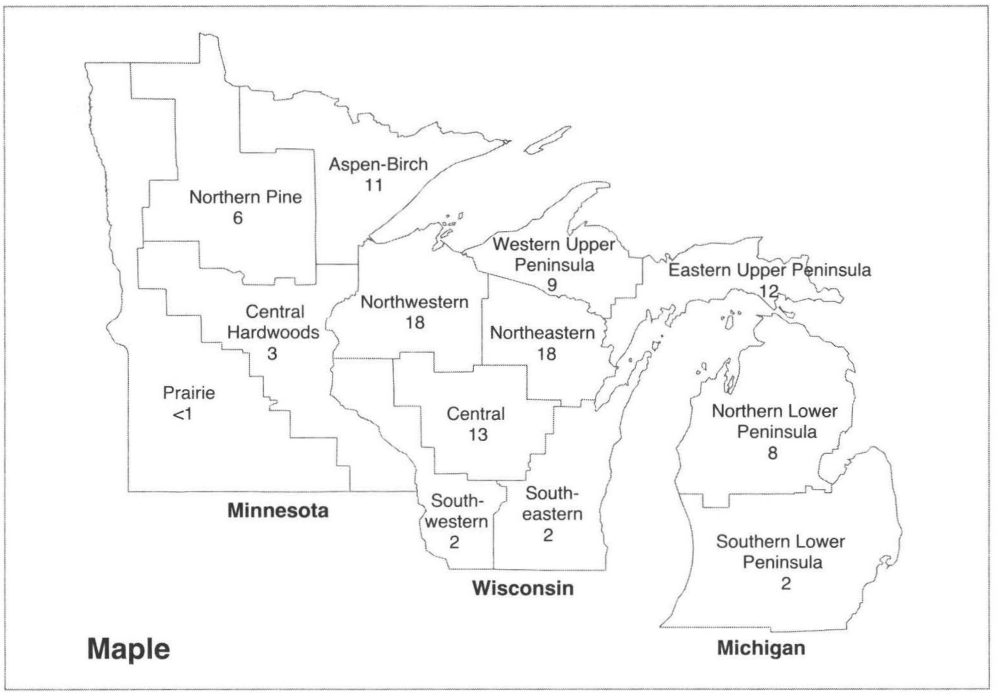
Figure 12.—*Cords of roundwood pulpwood (including chips from roundwood) harvested per 1,000 cords of growing-stock volume for each of five principal pulpwood species by Forest Survey Unit, 2003. Growing-stock volume was determined during the last forest inventory for each State.*






Aspen-Birch
35
Northern Pine
45
Western Upper
Peninsula
36
Eastern Upper Peninsula
33
Central
Hardwoods
28
Northwestern
36
Northeastern
34
Prairie
50
Central
41
Northern Lower
Peninsula
22
Minnesota
South-
western
4
South-
eastern
7
Southern Lower
Peninsula
7
Wisconsin
Michigan
Aspen


Aspen-Birch
14
Northern Pine
15
Western Upper
Peninsula
10
Eastern Upper Peninsula
11
Central
Hardwoods
12
Northwestern
26
Northeastern
27
Prairie
>100
Central
24
Northern Lower
Peninsula
10
Minnesota
South-
western
2
South-
eastern
3
Southern Lower
Peninsula
2
Wisconsin
Michigan
Birches


Aspen-Birch
11
Northern Pine
6
Western Upper
Peninsula
9
Eastern Upper Peninsula
12
Central
Hardwoods
3
Northwestern
18
Northeastern
18
Prairie
<1
Central
13
Northern Lower
Peninsula
8
Minnesota
South-
western
2
South-
eastern
2
Wisconsin
Southern Lower
Peninsula
2
Michigan
Maple

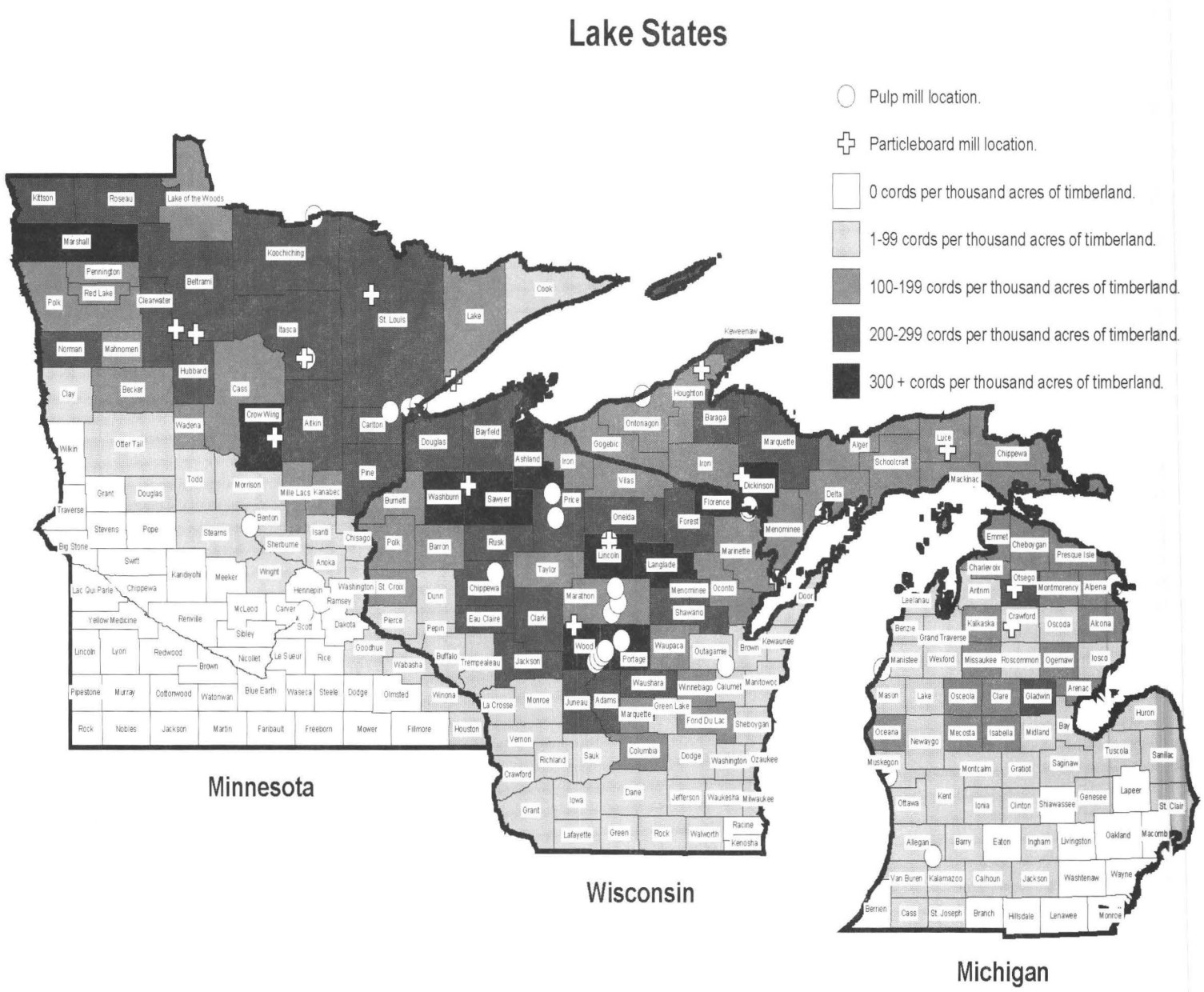
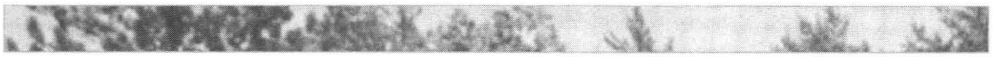

Lake States
Pulp mill location.
Particleboard mill location.
0 cords per thousand acres of timberland.
1-99 cords per thousand acres of timberland.
100-199 cords per thousand acres of timberland.
200-299 cords per thousand acres of timberland.
300 + cords per thousand acres of timberland.
Minnesota
Wisconsin
Michigan

Figure 13.—*Cords of pulpwood cut per 1,000 acres of timberland by county, 2003. Acres of timberland (stocking of trees greater than 10 percent) were determined during the last inventory in each State. Locations of active pulp and particleboard mills are shown.*



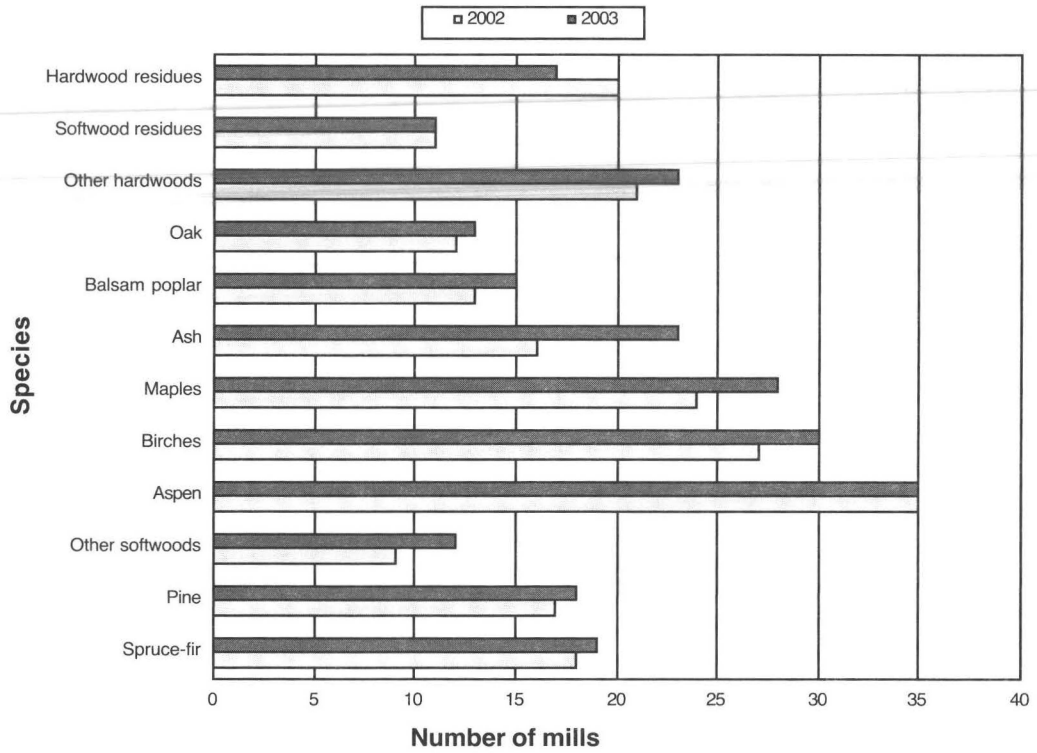
Pulpwood harvesting was most intensive (100,000 cords or more) in the following Forest Survey Units by species:

Species	State	Forest Survey Unit
Red pine	Wisconsin	Central
Spruce	Minnesota	Aspen-Birch
Aspen	Michigan	N. Lower Peninsula, W. Upper Peninsula, E. Upper Peninsula
	Minnesota	Northern Pine, Aspen-Birch, Central Hardwoods
	Wisconsin	Northwestern, Northeastern, Central
White birch	Minnesota	Aspen-Birch
	Wisconsin	Northwestern
Hard maple	Michigan	W. Upper Peninsula, E. Upper Peninsula
	Wisconsin	Northeastern, Northwestern
Soft maple	Michigan	N. Lower Peninsula, W. Upper Peninsula, E. Upper Peninsula
	Wisconsin	Northwestern, Northeastern

RECEIPTS

- In 2003, 29 wood pulp and 15 particleboard mills in the Lake States acquired 9.9 million cords of pulpwood, just 14 thousand cords less than the year before.
- Aspen roundwood was processed at 35 of the 44 pulp and particleboard plants in the Lake States in 2003 (fig. 14 and table 8).
- In 2003, Michigan supplied wood to 32 mills, Wisconsin supplied 31 mills, and Minnesota supplied 25 mills.

Figure 14.—*Numbers of industrial plants in the Lake States using a particular species or residue for pulping and particleboard, 2002-2003.*



- Total imports from outside the Lake States of all wood material in 2003 were 469 thousand cords, a decrease of 19 percent from 2002. Canada contributed 97 percent of the total import receipts.

- Imports of roundwood to Lake States pulp and particleboard mills decreased by 3 percent, while mill residue imports decreased by over 60 percent between 2002 and 2003.

Michigan

- The seven Michigan pulp mills, three OSB mills, one particleboard mill, and one molded strandwood mill consumed over 3.0 million cords in 2003, 3 percent more than in the previous year. Twelve percent of the total wood material consumed was imported from out of State. Wisconsin supplied over three-fourths of the imported wood material.

Minnesota

- The eight pulp mills, five OSB mills, and one laminated structural lumber mill in Minnesota reported consuming 3.4 million cords in 2003, a decrease of 4 percent from 2002. Pulp and particleboard mills in Minnesota acquired 19 percent of their raw material from out-of-State sources. Wisconsin supplied 55 percent of the imported wood material.

Wisconsin

- The 14 pulp mills, 2 OSB mills, and 2 particleboard mills in Wisconsin consumed 3.5 million cords in 2003, an increase of 1 percent from 2002. Sixteen percent of the total receipts were imported from out of State. Of the total wood material imported, 45 percent was brought in from Michigan.

INDUSTRY TRENDS AND ANALYSIS

Pulp Mills

For this section, pulp mill products include wood fiber products such as paper, paperboard, hardboard, insulation board, and medium-density fiberboard. All of these products are manufactured from wood that has been reduced to individual fibers, small fiber bundles, or fiber parts that are subsequently formed into a mat. Wood material from the Lake States sent to mills in other States and Canada is included.

- Of the 9.5 million cords of pulpwood produced in the Lake States in 2003, 6.7 million cords (70 percent) were used for wood pulp products. Overall, 87 percent came from roundwood and 13 percent came from mill residues.
- Principal species harvested for pulp in the Lake States in 2003 were aspen (1.6 million cords), soft maple (824 thousand cords), hard maple (751 thousand cords), and white birch (405 thousand cords) (fig. 15).
- Hardwoods were still the mainstays of the pulp mills in the region in 2003: hardwood roundwood contributed 65 percent of total raw material needs and hardwood residues supplied another 7 percent.
- Lake States softwood roundwood production for pulp mills decreased by 1 percent between 2002 and 2003. Softwood residues from the Lake States primary wood processors used by pulp mills increased by almost 9 percent from the previous year.
- Average daily wood pulp production in 2003 rose to 14.7 thousand tons of pulp per day, up from 14.6 thousand tons per day for the previous year (table 9).
- Lake States pulpwood production for pulp mills during 1999-2003 is shown in table A.

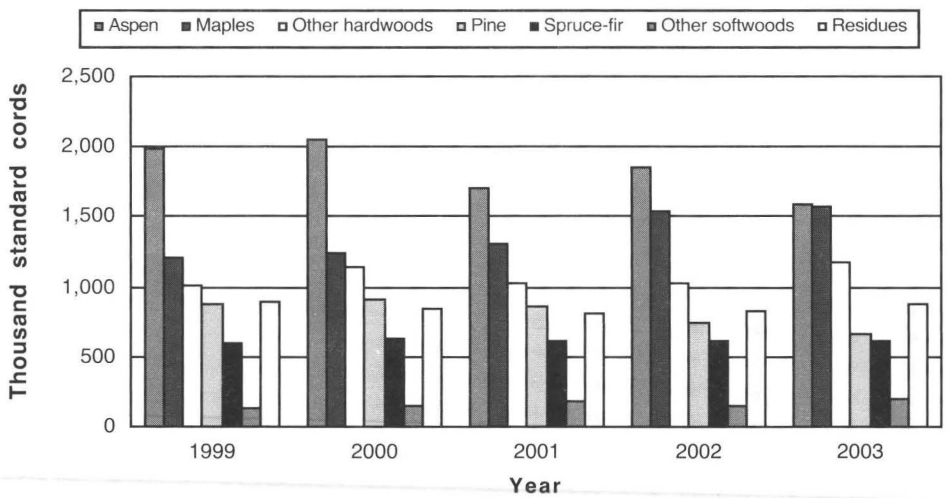


Figure 15.—*Pulpwood production in the Lake States for pulp by species group and residues, 1999-2003.*

Table A.—*Lake States pulpwood production for pulp mills during 1999-2003*

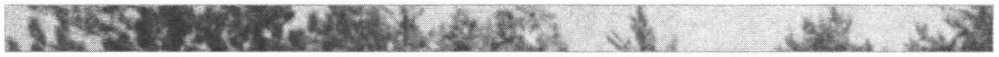
Product form and species group	Production				
	1999	2000	2001	2002	2003
	(Thousand cords)				
Roundwood					
Softwoods	1,599	1,674	1,658	1,500	1,480
Aspen	1,981	2,057	1,707	1,854	1,588
Other hardwoods	2,232	2,385	2,320	2,573	2,744
Residue	867	852	804	825	880
Total	6,680	6,968	6,488	6,753	6,693

Michigan

- Pulpwood production for wood pulp was 2.1 million cords in 2003, an increase of 1 percent from 2002.
- Soft maple, hard maple, and aspen were the major pulpwood species groups harvested in the State in 2003. All together, these three species groups accounted for over 60 percent of the total roundwood harvested.
- Michigan mills imported 233 thousand cords of pulpwood, or 12 percent of the wood material used for the production of wood pulp by Michigan wood pulp mills. Michigan exported almost 290 thousand cords to wood pulp mills in Minnesota, Wisconsin, and Canada.
- Michigan mills used almost 1.7 million cords of hardwood material in 2003, an increase of 2 percent from 2002. The use of softwood material decreased by almost 5 percent to 369 thousand cords during the same period.

Minnesota

- Pulpwood production for wood pulp totaled 1.6 million cords in 2003, a decrease of almost 8 percent from 2002.
- In 2003, aspen remained the predominant species harvested in the State with almost 668 thousand cords, or 47 percent of the total roundwood produced. Other major species harvested were spruce with 217 thousand cords and balsam fir with 160 thousand cords.
- Mills in Minnesota imported 535 thousand cords of wood material for pulp products, or 27 percent of the wood material used for the production of wood pulp. Minnesota exported 124 thousand cords to pulp mills in Wisconsin and 10 thousand cords to pulp mills in Canada.
- Minnesota mills had a 10-percent decrease in the use of hardwood material, from 1.6 million cords in 2002 to 1.4 million cords in 2003. The use of softwood material decreased by only 1 percent to 553 thousand cords in 2003.



Wisconsin

- Pulpwood production for wood pulp products increased by 1 percent, to 3.0 million cords in 2003.

- Aspen was the main species harvested with 597 thousand cords. Other major species harvested were hard maple (418 thousand cords), soft maple (390 thousand cords), red pine (264 thousand cords), white birch (227 thousand cords), and jack pine (192 thousand cords).

- Wisconsin mills imported almost 450 thousand cords of pulpwood: 238 thousand cords from Michigan, 124 thousand cords from Minnesota, 3 thousand cords from other States, and 84 thousand cords from Canada. Wisconsin exported 354 thousand cords to Minnesota, 224 thousand cords to Michigan, and 4 thousand cords to other States.

- Wisconsin pulp mills used 3 percent more hardwood material and 4 percent less softwood material in 2003 than in 2002.

Particleboard Mills

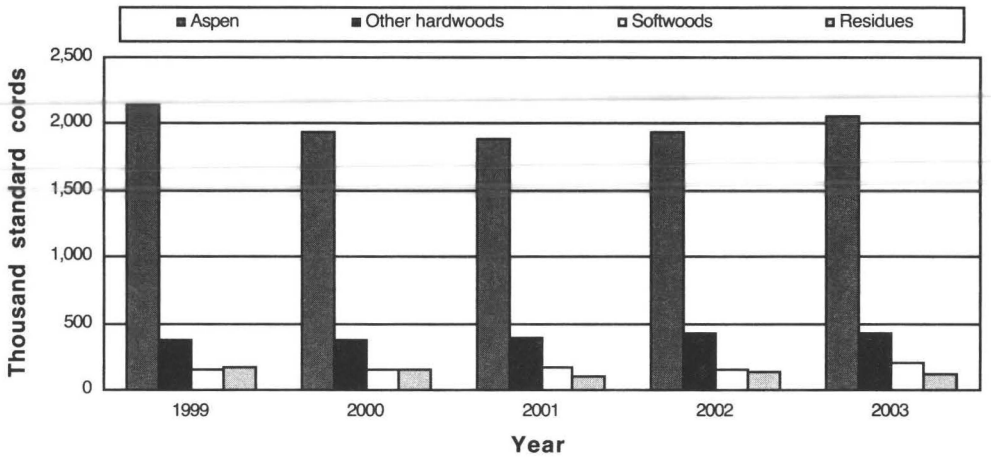
Particleboard is a generic term for a panel manufactured from lignocellulosic material—commonly wood—essentially in the form of particles (as distinct from fibers). These materials are bonded together with synthetic resin or other suitable binder under heat and pressure by a process wherein the inter-particle bonds are created wholly by the added binder. Other materials may have been added during manufacture to improve certain properties. The many types of particleboard differ greatly in regard to size and geometry of the particle, the amount of resin (adhesive) used, and the density to which the panel is pressed. Products included in the particleboard group include particleboard, waferboard, oriented strandboard (OSB), and engineered lumber. The major types of particles used for particleboard are shavings, flakes, wafers, chips, sawdust, strands, slivers, and wood wool (excelsior). Much of the particleboard in the U.S. is made from residues (shavings, sawdust, or chips). Waferboard, OSB, and engineered lumber are examples of products requiring that the particles be cut from solid wood (saw logs or pulpwood). Wood material from the Lake States sent to mills in other States and Canada is included.

- The Lake States produced 2.8 million cords of pulpwood in 2003 for particleboard products, up 6 percent from 2002.

- Twelve of the fifteen mills in the particleboard category were OSB or engineered wood product mills that require particles to be cut from roundwood. Hence, for every cord of pulpwood used in particleboard manufacture, 96 percent came from roundwood.

- Principal species harvested for particleboard products were aspen (2.1 million cords), white birch (148 thousand cords), jack pine (147 thousand cords), and soft maple (106 thousand cords) (fig. 16).

Figure 16.—*Pulpwood production for particleboard in the Lake States, 1999-2003.*



- In 2003, the Lake States produced 204 thousand cords of softwood roundwood and 2.5 million cords of hardwood roundwood for processing at particleboard plants. Roundwood production for the manufacture of particleboard products rose by almost 7 percent between 2002 and 2003. All the roundwood that was harvested in the Lake States for particleboard production stayed in the region.

- The Lake States in 2003 produced 43 thousand cords of softwood residues and 70 thousand cords of hardwood residues for use in particleboard production. Between 2002 and 2003, the use of residues for particleboard production decreased by 13 percent.

- Annual production at Lake States particleboard plants rose from 2,015 million square feet ¾-inch basis in 2002 to 2,125 million square feet ¾-inch basis in 2003 (table 10).

- Lake States pulpwood production for particleboard mills during 1999-2003 is shown in table B.

Table B.—*Lake States pulpwood production for particleboard mills during 1999-2003*

Product form and species group	Production				
	1999	2000	2001	2002	2003
	----------(Thousand cords)----------				
Roundwood					
Softwoods	152	160	174	149	204
Aspen	2,139	1,939	1,880	1,938	2,058
Other hardwoods	380	374	396	431	426
Residue	205	156	108	129	113
Total	2,876	2,628	2,558	2,647	2,801

Michigan

- The production of wood material for particleboard production in Michigan increased by 7 percent from 2002 to 2003, rising from 832 thousand cords in 2002 to 891 thousand cords in 2003.

- In 2003, the harvest of roundwood from Michigan forest land provided 837 thousand cords of wood for particleboard products, of which 112 thousand cords were softwoods and 724 thousand cords were hardwoods. Residues from Michigan primary wood-using mills provided another 53 thousand cords of wood material that were used to produce particleboard products.

- The particleboard mills in Michigan imported 55 thousand cords from Canada and 50 thousand cords from Wisconsin. Exports of all wood material for particleboard production amounted to 9 thousand cords, all of which went to Wisconsin.

Minnesota

- The production of roundwood for particleboard production in Minnesota increased by almost 6 percent from 2002 to 2003, rising from 1.3 million cords in 2002 to 1.4 million cords in 2003. In 2003, there were no residues from primary wood-using mills in Minnesota that were used in particleboard mills.

- Minnesota accounted for nearly half of all the wood material produced in the Lake States for particleboard plants in 2003. Aspen was the predominant species harvested (1.1 million cords) for particleboard production. White birch, at 119 thousand cords, was the second most important species harvested.

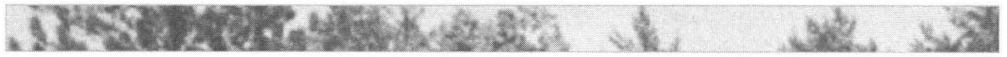
- The particleboard mills in Minnesota imported 111 thousand cords from Canada and 3 thousand cords from Wisconsin and North Dakota combined. In 2003, raw materials exported from the State for particleboard manufacturing totaled 67 thousand cords, all of which went to Wisconsin.

Wisconsin

- The production of wood material for particleboard production in Wisconsin increased by 4 percent from 2002 to 2003, rising from 495 thousand cords in 2002 to 516 thousand cords in 2003.

- In 2003, Wisconsin forest land produced 456 thousand cords of roundwood for particleboard manufacturing, of which 16 thousand cords were softwood and 441 thousand cords were hardwood. Wisconsin primary wood-processing mills provided an additional 60 thousand cords of plant byproducts to the particleboard industry.

- The mills in Wisconsin imported almost 105 thousand cords of wood for particleboard manufacturing: 67 thousand cords from Minnesota, 29 thousand cords from Canada, and 9 thousand cords from Michigan. Wisconsin exported 50 thousand cords to Michigan particleboard mills and 2 thousand cords to Minnesota particleboard mills in 2003.



Industry News

Major mill expansion, new construction, consolidations, name changes, and closures are as follows:

- Mead Corp. and Westvaco Corp. merged in January of 2002. Hence, the Mead Corp. mill at Escanaba, MI, changed to the combined company name of MeadWestvaco Corp.

- Cornell Felt Acquisition of Beloit bought the Globe Building Materials plant at Cornell, WI, in January 2001. Mule-Hide Dry Felt Manufacturing, a subsidiary of ABC Supply Co. in Beloit, leased and began operating the plant in March 2002.

- Sappi Fine Papers purchased the Potlatch pulp mill in Cloquet, MN, in May 2002. The mill's name was changed to Sappi Cloquet, LLC.

- The Stora Enso North America mill at Kimberly, WI, switched from processing roundwood to market pulp in 2003.

CENTRAL STATES

PRODUCTION

- Pulpwood production in the Central States (Illinois, Indiana, Iowa, and Missouri) increased by 8 percent—from 427 thousand cords in 2002 to 462 thousand cords in 2003.

- Pulpwood production from residues from primary wood-processing mills in the Central States increased by almost 14 percent while pulpwood production from roundwood decreased by less than 1 percent.

- Wood residues accounted for more than two-thirds of the total wood material produced in the Central States for the pulp and particleboard industry in 2003 (table 11).

- Pulpwood production from softwood roundwood increased by 60 percent from 2002 to 2003, soft hardwood[7] roundwood production increased by 22 percent, and hard hardwood[8] production decreased by 7 percent (table 12 and fig. 17).

- Exports of roundwood and residues from the Central States in 2003 accounted for 77 percent of all wood material produced in the region for pulpwood production. Roundwood exports totaled 121 thousand cords, and the export of residues from other wood-using mills totaled 237 thousand cords.

- Loggers harvested pulpwood in 15 counties in Illinois, 13 counties in Indiana, 3 counties in Iowa, and 16 counties in Missouri (fig. 18).

- Pulpwood production from whole-tree chips increased by 17 percent between 2002 and 2003. The 28 thousand cords of whole-tree chips made up 19 percent of the total roundwood produced in the Central States in 2003.

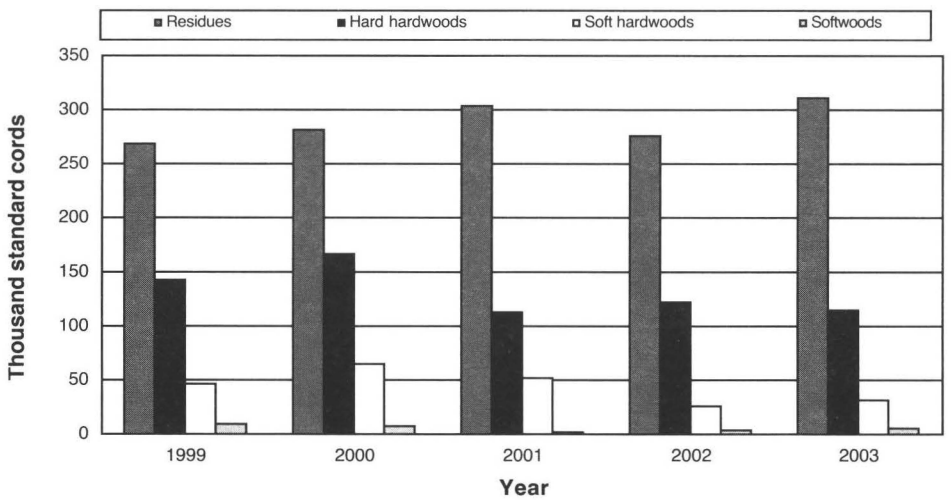


Figure 17.—*Pulpwood production in the Central States, 1999-2003.*

[7] *Hardwood species with an average specific gravity of 0.50 or less.*

[8] *Hardwood species with an average specific gravity greater than 0.50.*

Illinois

- Illinois does not have any primary wood pulp or particleboard mills; consequently, all pulpwood harvested and residues produced by primary wood-processing mills, which are utilized by pulp or particleboard mills, are shipped to plants outside the State.

- Illinois produced 44 thousand cords of pulpwood in 2003, a decrease of 25 percent from the previous year (table 13).

- Illinois produced the second largest volume of pulpwood roundwood in the Central States in 2003, supplying 21 percent of the total roundwood production in the region. Pulpwood production from residues accounted for only 4 percent of the total residue production. Overall, Illinois contributed 10 percent of the total pulpwood produced in the Central States in 2003 (fig. 19).

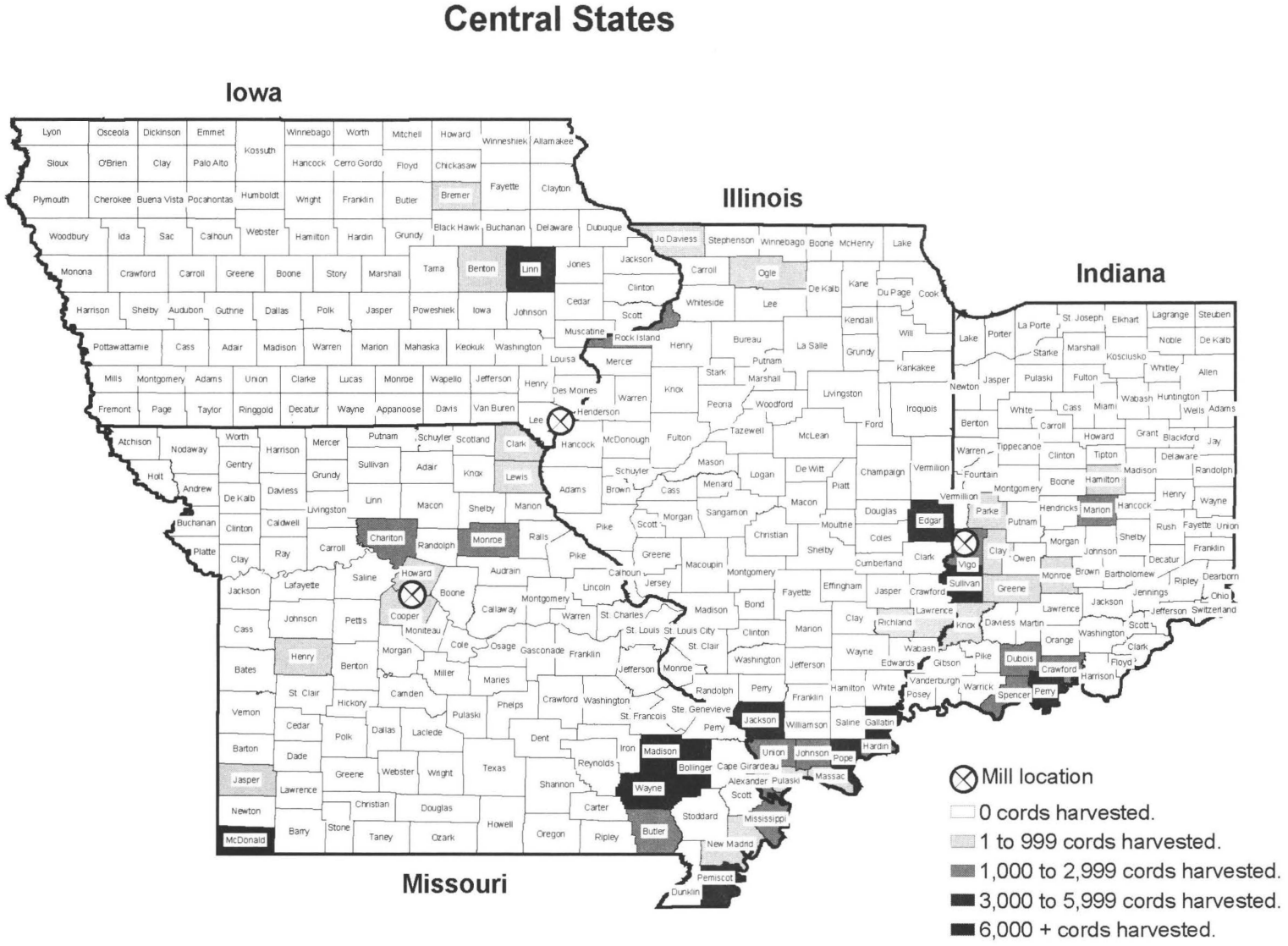
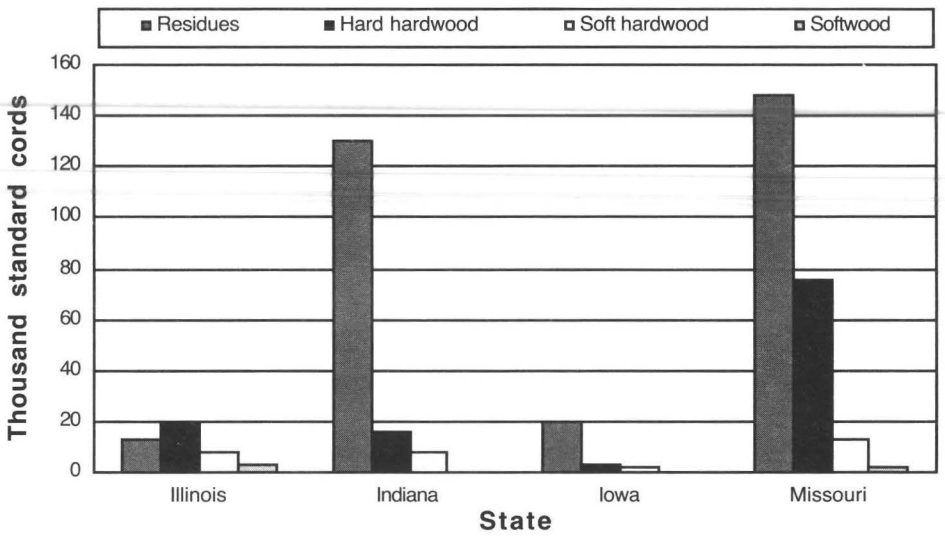


Figure 18.—*Production of pulpwood from roundwood (including chips from roundwood) in the Central States by county, in standard cords, 2003. Locations of active Central States pulp mills are shown.*

Figure 19.—*Central States pulpwood production by species group and residues, 2003.*



Indiana

- Pulpwood production in Indiana accounted for one-third of the total pulpwood produced in the Central States in 2003. That year, 154 thousand cords of wood material were produced in Indiana, a 14-percent increase from the 2002 level of 135 thousand cords.

- Roundwood production increased by almost 50 percent, from 16 thousand cords in 2002 to 24 thousand cords in 2003. Residue production increased by 9 percent, rising from 119 thousand cords in 2002 to 131 thousand cords in 2003.

Iowa

- The total pulpwood production in Iowa in 2003 was 25 thousand cords, a decrease of 18 percent from 2002. The State contributed 5 percent of the total pulpwood produced in the Central States.

- Roundwood production from Iowa increased from 1 thousand cords in 2002 to 5 thousand cords in 2003.

- Residues accounted for nearly 80 percent of pulpwood production in Iowa in 2003.

Missouri

- Missouri remained the largest producer of pulpwood in the Central States in 2003, with 52 percent of the regional total, or 239 thousand cords. The production of pulpwood in Missouri increased by 18 percent between 2002 and 2003.

- Missouri remained the Central States largest producer of roundwood for pulpwood and replaced Indiana as the largest supplier of residues from primary wood-processing plants used for pulpwood production in 2003. The State produced over 90 thousand cords of roundwood and 149 thousand cords of residues.

- Missouri exported over 90 percent (221 thousand cords) of its pulpwood production to mills in the Southern States.

RECEIPTS

Due to the limited number of pulp mills in the Central States, individual State receipts are not reported to avoid disclosure of individual mill receipts.

- Pulp mills in the Central States received 108 thousand cords in 2003, a decrease of 3 percent from 2002.

- Roundwood receipts increased by 19 percent—from 24 thousand cords in 2002 to 29 thousand cords in 2003. Residue receipts decreased by 9 percent—from 87 thousand cords in 2002 to 79 thousand cords in 2003.

- Softwood was not used for pulpwood by the Central States pulp mills.

INDUSTRY TRENDS AND ANALYSIS

- Average daily wood pulp production increased from 473 tons in 2002 to 563 tons in 2003 (table 14).

- In 2003, only 19 percent of the roundwood and 24 percent of the residues produced for pulpwood in the Central States went to pulp mills located in the Central States.

- Hardwood residue from sawmills and other wood-using mills accounted for almost three-fourths of all the wood material used by the Central States pulp mills. It continues to be the dominant form of wood material procured.

PLAINS STATES

Due to the limited number of pulp mills in the Plains States, detailed production and receipts are not reported to avoid disclosure of individual mill receipts.

PRODUCTION

- In 2003, the Plains States produced 64 thousand cords of roundwood and mill residues for pulpwood production, a decrease of 48 percent from 2002 (fig. 20). Pulpwood came from Kansas, North Dakota, and South Dakota.

- Softwood residues accounted for over three-fourths of the pulpwood production for the Plains States in 2003 (fig. 21), all of which came from South Dakota.

- The only species harvested from the Plains States for pulpwood production in 2003 were ponderosa pine, aspen, balsam poplar, and cottonwood.

- The only mill in the Plains States in 2003 was Merillat Industries, Inc. (particleboard), in Rapid City, SD, which has an annual production capacity of 95 million square feet ¾-inch basis.

Figure 20.—*Pulpwood production in the Plains States, 1999-2003.*

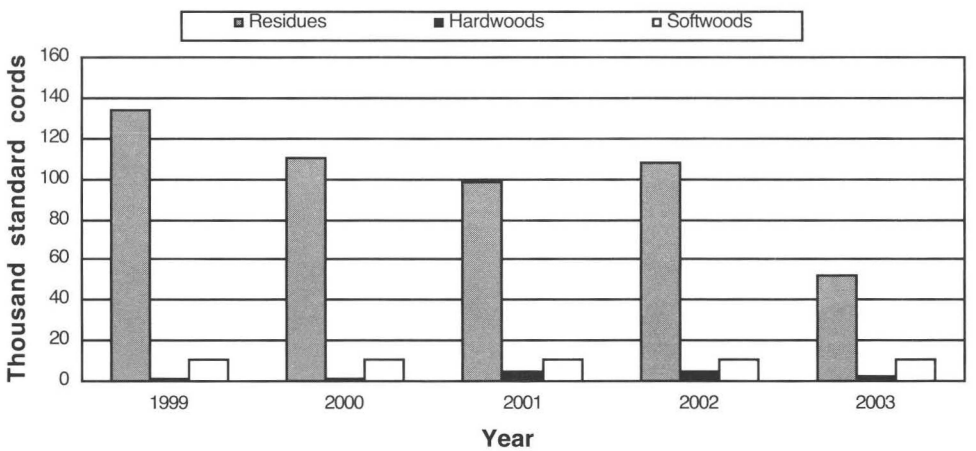
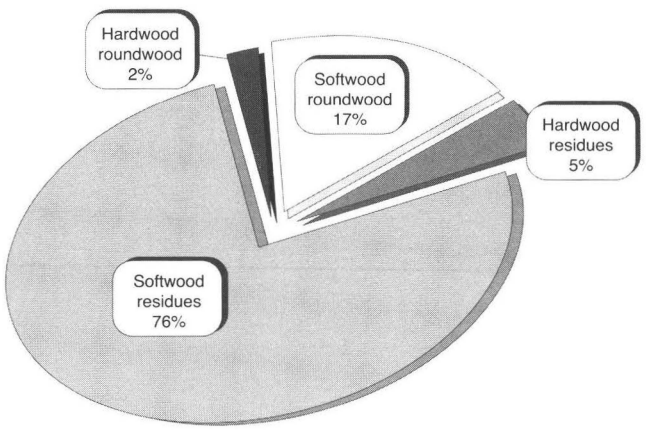
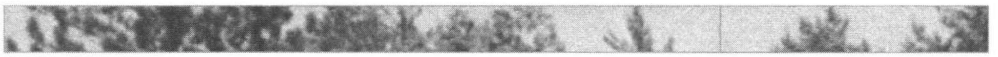


Figure 21.—*Plains States pulpwood production by species group and residues, 2003.*





APPENDIX

CONVERSION FACTORS USED IN THE NORTH-CENTRAL REGION

Standard cords of green roundwood per green ton:

Species	Factor	Species	Factor
Softwoods	0.4688	White birch	0.4018
Northern white-cedar	.6329	Yellow birch	.3723
Balsam fir	.4688	River birch	.3871
Hemlock	.4150	Sweetgum	.3669
Jack pine	.4688	Yellow-poplar	.4219
Red pine	.4688	Blackgum	.3779
White pine	.4777	Sycamore	.4083
Shortleaf pine	.3956	Cottonwood	.4291
Spruce	.5014	Elm	.4018
Tamarack	.4291	Hickory	.3701
Hardwoods	.3939	Hard maple	.3617
Soft hardwoods	.4171	Soft maple	.4083
Hard hardwoods	.3708	Black cherry	.4688
Ash	.4330	Red oak	.3444
Aspen	.4291	White oak	.3723
Balsam poplar	.4083	Black oak	.3444
Basswood	.5167	Other hardwoods	.4777
Beech	.3956		

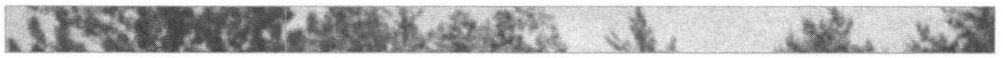


TABLE TITLES

Table 1.—*Production and imports of pulpwood, Lake States, 2003*

Table 2.—*Lake States pulpwood production by State of origin, year, and destination, 1999-2003*

Table 3.—*Lake States pulpwood production from roundwood by State, Forest Survey Unit, and species group, 1999-2003*

Table 4.—*Lake States pulpwood production by State of origin, product form, Forest Survey Unit, and destination, 2003*

Table 5.—*Pulpwood production from roundwood by Forest Survey Unit, county, and species group, Michigan, 2003*

Table 6.—*Pulpwood production from roundwood by Forest Survey Unit, county, and species group, Minnesota, 2003*

Table 7.—*Pulpwood production from roundwood by Forest Survey Unit, county, and species group, Wisconsin, 2003*

Table 8.—*Number of industrial pulp or particleboard plants in the Lake States by product form, species group used, and State, 2003*

Table 9.—*Average daily production of active wood pulp mills in the Lake States by State, company, location, and type of pulp produced, 2003*

Table 10.—*Annual production of active particleboard and panel mills in the Lake States by State, company, location, and product produced, 2003*

Table 11.—*Production and imports of pulpwood, Central States, 2003*

Table 12.—*Central States pulpwood production by product form and species group, 1999-2003*

Table 13.—*Central States pulpwood production by State and destination, 1999-2003*

Table 14.—*Average daily production of active wood pulp mills in the Central States by company, location, and type of pulp produced, 2003*

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Table 1.--Production and imports of pulpwood, Lake States, 2003

(In standard cords, unpeeled)

Product form, species group, and destination	Production by State			Regional total	Imports			Total imports	Total receipts
	Michigan	Minnesota	Wisconsin		Central States	Plains States	Canada		
Softwood roundwood									
Northern white-cedar									
Michigan	3,402	--	59	3,461	--	--	--	--	3,461
Total	3,402	--	59	3,461	--	--	--	--	3,461
Balsam fir									
Canada	4,955	--	--	4,955	--	--	--	--	--
Michigan	53,946	--	1,028	54,974	--	--	--	--	54,974
Minnesota	1,394	168,056	29,809	199,259	--	--	1,050	1,050	200,309
Wisconsin	5,956	414	40,660	47,030	--	--	40	40	47,070
Total	66,251	168,470	71,497	306,218	--	--	1,090	1,090	302,352
Hemlock									
Michigan	71,020	--	7,223	78,242	--	--	--	--	78,242
Wisconsin	933	--	19,465	20,397	--	--	--	--	20,397
Total	71,953	--	26,687	98,640	--	--	--	--	98,640
Jack pine									
Michigan	133,589	--	353	133,942	--	--	--	--	133,942
Minnesota	--	84,858	3,827	88,686	--	--	178	178	88,864
Wisconsin	7,511	6,180	191,293	204,985	280	--	--	280	205,265
Total	141,100	91,038	195,474	427,612	280	--	178	458	428,071
Red pine									
Michigan	42,711	--	668	43,378	--	--	--	--	43,378
Minnesota	--	33,178	2,815	35,994	--	--	--	--	35,994
Wisconsin	3,649	2,408	262,967	269,023	792	--	--	792	269,815
Total	46,360	35,586	266,450	348,395	792	--	--	792	349,187
White pine									
Michigan	9,562	--	140	9,702	--	--	--	--	9,702
Minnesota	--	1,364	66	1,430	--	--	--	--	1,430
Wisconsin	905	322	61,420	62,647	543	--	151	694	63,341
Total	10,466	1,686	61,626	73,779	543	--	151	694	74,473
Spruce									
Canada	5,956	--	--	5,956	--	--	--	--	--
Michigan	26,213	--	415	26,628	--	--	--	--	26,628
Minnesota	282	167,112	9,660	177,054	--	--	9,173	9,173	186,227
Wisconsin	16,854	51,045	54,668	122,567	--	--	8,639	8,639	131,206
Total	49,306	218,157	64,743	332,206	--	--	17,812	17,812	344,061

Tamarack									
Michigan	10,250	--	208	10,458	--	--	--	--	10,458
Minnesota	--	37,765	11	37,777	--	--	24	24	37,801
Wisconsin	5,830	20,866	18,894	45,590	--	--	1,459	1,459	47,049
Total	16,080	58,632	19,113	93,825	--	--	1,484	1,484	95,309
Total softwood roundwood									
Canada	10,912	--	--	10,912	--	--	--	--	--
Michigan	350,692	--	10,095	360,786	--	--	--	--	360,786
Minnesota	1,676	492,334	46,189	540,199	--	--	10,425	10,425	550,625
Wisconsin	41,638	81,235	649,366	772,239	1,615	--	10,289	11,904	784,144
Total	404,917	573,569	705,650	1,684,137	1,615	--	20,714	22,329	1,695,555
Softwood residues									
Canada	14,434	7,842	--	22,276	--	--	--	--	--
Michigan	157,965	--	78	158,043	--	--	--	--	158,043
Minnesota	--	75,156	1,824	76,981	--	--	--	--	76,981
Wisconsin	91,205	1,575	103,450	196,230	--	--	15,521	15,521	211,751
Total	263,604	84,573	105,352	453,529	--	--	15,521	15,521	446,775
Total softwood material									
Canada	25,346	7,842	--	33,188	--	--	--	--	--
Michigan	508,657	--	10,173	518,829	--	--	--	--	518,829
Minnesota	1,676	567,490	48,014	617,180	--	--	10,425	10,425	627,605
Wisconsin	132,843	82,810	752,816	968,469	1,615	--	25,810	27,425	995,895
Total	668,522	658,142	811,002	2,137,666	1,615	--	36,236	37,851	2,142,329

(Table 1 continued on next page)

(Table 1 continued)

Product form, species group, and destination	Production by State			Regional total	Imports			Total imports	Total receipts
	Michigan	Minnesota	Wisconsin		Central States	Plains States	Canada		
Hardwood roundwood									
Ash									
Michigan	25,527	--	4,483	30,010	--	--	450	450	30,460
Minnesota	130	9,993	3,313	13,436	--	--	2,342	2,342	15,779
Wisconsin	5,469	194	77,155	82,818	--	--	2,284	2,284	85,102
Total	31,127	10,187	84,951	126,264	--	--	5,077	5,077	131,341
Aspen									
Michigan	821,005	--	40,531	861,537	--	--	53,125	53,125	914,662
Minnesota	4,712	1,730,092	137,212	1,872,016	--	1,390	193,426	194,816	2,066,832
Wisconsin	37,544	65,710	809,160	912,415	--	--	29,494	29,494	941,909
Total	863,261	1,795,802	986,904	3,645,967	--	1,390	276,045	277,435	3,923,402
Balsam poplar									
Michigan	42,895	--	634	43,529	--	--	1,582	1,582	45,112
Minnesota	123	118,859	3,139	122,121	--	9	14,350	14,359	136,480
Wisconsin	--	--	--	--	--	--	16	16	16
Total	43,018	118,859	3,773	165,650	--	9	15,949	15,957	181,607
Basswood									
Michigan	55,933	--	17,291	73,224	--	--	806	806	74,030
Minnesota	687	14,762	12,666	28,116	--	--	3,193	3,193	31,308
Wisconsin	1,892	271	49,378	51,541	--	--	739	739	52,279
Total	58,512	15,033	79,335	152,881	--	--	4,737	4,737	157,618
Beech									
Michigan	51,733	--	11,917	63,650	--	--	1,234	1,234	64,885
Wisconsin	235	--	2,651	2,886	--	--	--	--	2,886
Total	51,968	--	14,569	66,536	--	--	1,234	1,234	67,771
White birch									
Michigan	90,526	--	12,497	103,024	--	--	1,254	1,254	104,277
Minnesota	507	189,058	11,839	201,405	--	--	7,489	7,489	208,894
Wisconsin	13,064	29,594	206,573	249,230	--	--	26,070	26,070	275,300
Total	104,097	218,652	230,909	553,659	--	--	34,812	34,812	588,471
Yellow birch									
Michigan	37,328	--	9,579	46,907	--	--	968	968	47,875
Minnesota	--	149	--	149	--	--	--	--	149
Wisconsin	2,566	--	23,037	25,603	--	--	591	591	26,194
Total	39,894	149	32,616	72,659	--	--	1,559	1,559	74,218
Cottonwood									
Minnesota	--	1,031	--	1,031	--	186	--	186	1,217
Wisconsin	--	--	1,063	1,063	--	--	--	--	1,063
Total	--	1,031	1,063	2,094	--	186	--	186	2,280

Elm									
Michigan	1,602	--	--	1,602	--	--	--	--	1,602
Minnesota	386	1,446	2,836	4,667	--	--	309	309	4,977
Wisconsin	1,135	--	14,062	15,197	--	--	442	442	15,639
Total	3,124	1,446	16,897	21,467	--	--	751	751	22,218
Hickory									
Michigan	2,873	--	--	2,873	--	--	--	--	2,873
Total	2,873	--	--	2,873	--	--	--	--	2,873
Hard maple									
Michigan	316,316	--	68,578	384,894	--	--	6,959	6,959	391,853
Minnesota	4,689	15,708	32,046	52,443	--	--	1,254	1,254	53,697
Wisconsin	23,282	314	321,015	344,611	--	--	11,045	11,045	355,656
Total	344,287	16,021	421,639	781,948	--	--	19,258	19,258	801,206
Soft maple									
Michigan	420,773	--	74,134	494,907	--	--	7,643	7,643	502,551
Minnesota	12,351	71,197	98,518	182,067	--	--	12,736	12,736	194,803
Wisconsin	16,226	5,518	231,849	253,592	--	--	8,761	8,761	262,353
Total	449,350	76,715	404,501	930,566	--	--	29,140	29,140	959,706
Red oak									
Michigan	52,387	--	5,401	57,787	--	--	537	537	58,325
Wisconsin	2,873	395	143,080	146,348	--	--	5,810	5,810	152,157
Total	55,260	395	148,481	204,135	--	--	6,347	6,347	210,482
White oak									
Michigan	21,122	--	--	21,122	--	--	--	--	21,122
Wisconsin	1,205	106	31,414	32,725	--	--	2,206	2,206	34,931
Total	22,328	106	31,414	53,847	--	--	2,206	2,206	56,054
Other hardwoods									
Michigan	22,354	--	4,799	27,153	--	--	497	497	27,650
Minnesota	459	1,719	3,371	5,549	--	--	368	368	5,917
Wisconsin	431	--	3,095	3,526	--	--	--	--	3,526
Total	23,245	1,719	11,265	36,228	--	--	865	865	37,093

(Table 1 continued on next page)

(Table 1 continued)

Product form, species group, and destination	Production by State			Regional total	Imports			Total imports	Total receipts
	Michigan	Minnesota	Wisconsin		Central States	Plains States	Canada		
Total hardwood roundwood									
Michigan	1,962,376	--	249,844	2,212,220	--	--	75,056	75,056	2,287,276
Minnesota	24,045	2,154,013	304,941	2,482,999	--	1,585	235,467	237,052	2,720,051
Wisconsin	105,922	102,102	1,913,532	2,121,556	--	--	87,457	87,457	2,209,013
Total	2,092,344	2,256,115	2,468,317	6,816,775	--	1,585	397,980	399,565	7,216,340
Hardwood residues									
Canada	--	2,091	--	2,091	--	--	--	--	--
Michigan	218,083	--	14,536	232,619	8,786	--	--	8,786	241,405
Minnesota	--	35,782	2,526	38,308	--	--	21,290	21,290	59,597
Other[2]	--	--	3,833	3,833	--	--	--	--	--
Wisconsin	8,286	6,032	248,765	263,083	1,776	--	--	1,776	264,859
Total	226,369	43,905	269,660	539,934	10,562	--	21,290	31,851	565,861
Total hardwood material									
Canada	--	2,091	--	2,091	--	--	--	--	--
Michigan	2,180,459	--	264,380	2,444,839	8,786	--	75,056	83,842	2,528,681
Minnesota	24,045	2,189,795	307,467	2,521,307	--	1,585	256,756	258,341	2,779,648
Other[2]	--	--	3,833	3,833	--	--	--	--	--
Wisconsin	114,209	108,134	2,162,296	2,384,638	1,776	--	87,457	89,233	2,473,871
Total	2,318,713	2,300,019	2,737,976	7,356,709	10,562	1,585	419,269	431,416	7,782,201
Total all roundwood									
Canada	10,912	--	--	10,912	--	--	--	--	--
Michigan	2,313,068	--	259,938	2,573,007	--	--	75,056	75,056	2,648,063
Minnesota	25,721	2,646,347	351,130	3,023,198	--	1,585	245,892	247,477	3,270,676
Wisconsin	147,560	183,337	2,562,898	2,893,795	1,615	--	97,746	99,361	2,993,156
Total	2,497,261	2,829,684	3,173,967	8,500,912	1,615	1,585	418,694	421,894	8,911,894
Total all residues									
Canada	14,434	9,933	--	24,367	--	--	--	--	--
Michigan	376,048	--	14,614	390,662	8,786	--	--	8,786	399,448
Minnesota	--	110,938	4,350	115,288	--	--	21,290	21,290	136,578
Other[2]	--	--	3,833	3,833	--	--	--	--	--
Wisconsin	99,491	7,607	352,214	459,313	1,776	--	15,521	17,297	476,610
Total	489,973	128,478	375,012	993,463	10,562	--	36,811	47,373	1,012,636
Total all wood material									
Canada	25,346	9,933	--	35,279	--	--	--	--	--
Michigan	2,689,116	--	274,553	2,963,669	8,786	--	75,056	83,842	3,047,510
Minnesota	25,721	2,757,285	355,481	3,138,487	--	1,585	267,182	268,767	3,407,254
Other[2]	--	--	3,833	3,833	--	--	--	--	--
Wisconsin	247,052	190,944	2,915,112	3,353,108	3,391	--	113,267	116,658	3,469,766
Total	2,987,235	2,958,161	3,548,979	9,494,375	12,177	1,585	455,505	469,267	9,924,530

[1] Vertical columns of figures under the box heading "Production by State" present the amount of roundwood cut or residue generated in each State.

[2] Pulpwood shipped to mills outside of region.

Table may not add due to rounding.

Table 2.--Lake States pulpwood production by State of origin, year, and destination, 1993-2003

(In thousand standard cords, unpeeled) [1]

MICHIGAN

Year	Total production	Destination of pulpwood			
		Michigan	Minnesota	Wisconsin	Other[2]
1999	3,115	2,753	5	306	50
2000	3,140	2,834	7	272	27
2001	2,898	2,570	9	299	20
2002	2,900	2,615	10	254	21
2003	2,987	2,689	26	247	25
5-year average	3,008	2,692	11	276	29

MINNESOTA

Year	Total production	Destination of pulpwood			
		Michigan	Minnesota	Wisconsin	Other[2]
1999	3,104	--	2,851	216	39
2000	3,036	--	2,803	211	21
2001	2,839	--	2,630	187	22
2002	3,015	--	2,865	139	11
2003	2,958	--	2,757	191	10
5-year average	2,990	--	2,781	189	21

WISCONSIN

Year	Total production	Destination of pulpwood			
		Michigan	Minnesota	Wisconsin	Other[2]
1999	3,336	206	63	3,064	2
2000	3,420	195	151	3,068	6
2001	3,309	274	133	2,898	4
2002	3,485	256	360	2,864	6
2003	3,549	275	355	2,915	4
5-year average	3,420	241	212	2,962	4

[1] Includes mill residues used for pulp.

[2] Includes Canada.

Table may not add due to rounding.

Table 3.--Lake States pulpwood production from roundwood by State, Forest Survey Unit, and species group, 1999-2003

(In thousand standard cords, unpeeled)

Forest Survey Unit	All species					Pine					Spruce				
	1999	2000	2001	2002	2003	1999	2000	2001	2002	2003	1999	2000	2001	2002	2003
MICHIGAN															
Eastern Upper Peninsula	627	575	646	629	603	110	110	117	69	56	24	19	26	19	18
Western Upper Peninsula	1,120	1,141	959	933	953	72	66	59	46	40	23	30	32	27	27
Northern Lower Peninsula	797	884	789	829	874	108	106	106	74	100	2	3	2	1	4
Southern Lower Peninsula	87	76	53	61	68	1	1	1	2	2	*	*	--	--	--
Total	2,632	2,676	2,446	2,451	2,497	291	283	284	192	198	50	51	61	47	49
MINNESOTA															
Aspen-Birch	1,171	1,210	1,171	1,233	1,179	27	44	59	60	43	102	125	148	145	150
Northern Pine	1,449	1,428	1,318	1,373	1,350	46	62	63	88	75	45	56	51	69	67
Central Hardwoods	237	228	180	210	217	12	10	15	14	10	1	1	1	1	1
Prairie	94	71	86	91	84	*	*	*	*	1	*	*	*	*	*
Total	2,951	2,937	2,755	2,907	2,830	84	116	138	163	128	149	182	200	215	218
WISCONSIN															
Northeastern	899	1,002	1,001	994	1,079	117	146	115	88	109	21	31	24	19	26
Northwestern	1,209	1,211	1,159	1,340	1,311	164	190	168	134	103	21	28	15	25	30
Central	695	650	645	634	681	290	262	270	251	261	5	4	6	3	5
Southwestern	79	87	78	80	61	51	44	31	29	32	2	2	2	1	2
Southeastern	18	25	50	39	42	13	13	15	19	19	1	2	2	1	2
Total	2,900	2,974	2,932	3,087	3,174	635	655	600	521	524	50	66	49	49	65
Total Lake States	8,483	8,588	8,133	8,446	8,501	1,010	1,054	1,021	875	850	249	300	309	311	332

(Table 3 continued on next page)

(Table 3 continued)

MICHIGAN

Forest Survey Unit	Balsam fir					Other softwoods					Aspen				
	1999	2000	2001	2002	2003	1999	2000	2001	2002	2003	1999	2000	2001	2002	2003
Eastern Upper Peninsula	31	23	26	33	26	25	24	40	32	33	165	144	153	160	149
Western Upper Peninsula	37	36	33	33	33	57	65	62	51	55	287	308	292	269	286
Northern Lower Peninsula	5	6	4	4	7	1	*	1	*	4	354	380	366	388	410
Southern Lower Peninsula	*	--	--	*	--	*	--	--	--	--	26	19	15	15	18
Total	73	64	64	70	66	82	90	103	84	91	832	850	826	832	863
MINNESOTA															
Aspen-Birch	108	110	101	94	93	10	12	25	20	37	804	780	699	754	632
Northern Pine	85	72	68	74	74	3	6	21	7	21	1,142	1,091	968	970	921
Central Hardwoods	1	2	1	1	1	*	*	*	*	*	204	194	147	156	168
Prairie	*	--	*	*	*	*	*	*	*	*	91	69	82	84	75
Total	194	184	171	169	168	12	18	46	28	59	2,241	2,134	1,895	1,965	1,796
WISCONSIN															
Northeastern	40	40	35	31	25	24	25	24	22	31	300	343	291	290	320
Northwestern	50	42	48	39	45	13	10	7	13	10	529	507	415	546	479
Central	1	1	1	1	1	2	2	2	4	3	203	147	137	145	172
Southwestern	*	4	*	--	*	*	--	*	2	--	14	12	12	11	9
Southeastern	*	--	*	*	*	*	*	*	*	1	1	3	10	5	7
Total	92	87	84	71	71	39	37	33	40	46	1,047	1,012	865	996	987
Total Lake States	359	335	319	311	306	133	144	182	152	196	4,120	3,996	3,586	3,793	3,646

MICHIGAN

Forest Survey Unit	White and yellow birches					Hard and soft maples					Other hardwoods				
	1999	2000	2001	2002	2003	1999	2000	2001	2002	2003	1999	2000	2001	2002	2003
Eastern Upper Peninsula	27	47	43	45	45	209	170	194	212	211	36	40	46	58	65
Western Upper Peninsula	63	110	68	71	73	460	415	308	340	339	121	112	104	95	100
Northern Lower Peninsula	30	43	31	28	25	170	219	196	239	222	127	127	83	95	102
Southern Lower Peninsula	1	1	*	1	1	28	26	16	19	22	31	28	20	23	25
Total	122	200	142	144	144	867	830	714	810	794	315	308	253	272	291
MINNESOTA															
Aspen-Birch	61	72	70	77	112	8	19	24	33	46	52	48	45	51	66
Northern Pine	74	73	71	77	91	1	16	18	25	34	53	51	58	62	69
Central Hardwoods	8	9	7	11	16	6	10	8	14	13	4	3	2	11	7
Prairie	*	*	*	1	1	1	--	--	*	*	2	2	4	6	7
Total	144	154	148	166	219	15	45	50	72	93	111	104	109	130	149
WISCONSIN															
Northeastern	89	89	91	95	100	188	212	287	332	340	120	117	132	118	129
Northwestern	128	133	110	119	128	194	207	258	333	361	110	94	138	131	155
Central	27	30	28	27	32	64	75	90	101	110	102	128	111	102	98
Southwestern	2	3	3	8	2	3	11	20	20	9	6	11	10	10	7
Southeastern	1	1	3	2	2	1	4	12	7	7	2	3	8	5	4
Total	247	257	235	251	264	451	509	666	793	826	339	351	400	366	392
Total Lake States	513	611	525	561	626	1,334	1,384	1,430	1,675	1,713	765	763	761	768	832

* Less than 500 standard cords.

Table may not add due to rounding.

Table 4.--Lake States pulpwood production by State of origin, product form, Forest Survey Unit, and destination, 2003

(In thousand standard cords, unpeeled)

MICHIGAN

Product form and Forest Survey Unit	Total production	Destination of pulpwood			
		Michigan	Minnesota	Wisconsin	Other
Roundwood					
Eastern Upper Peninsula	603	550	2	48	3
Western Upper Peninsula	953	833	24	96	1
Northern Lower Peninsula	874	863	--	4	7
Southern Lower Peninsula	68	68	--	--	--
Total	2,497	2,313	26	148	11
Residues	490	376	--	99	14
Total pulpwood	2,987	2,689	26	247	25

MINNESOTA

Product form and Forest Survey Unit	Total production	Destination of pulpwood			
		Michigan	Minnesota	Wisconsin	Other
Roundwood					
Aspen-Birch	1,179	--	1,087	92	--
Northern Pine	1,350	--	1,335	15	--
Central Hardwoods	217	--	140	77	--
Prairie	84	--	84	*	--
Total	2,830	--	2,646	183	--
Residues	128	--	111	8	10
Total pulpwood	2,958	--	2,757	191	10

WISCONSIN

Product form and Forest Survey Unit	Total production	Destination of pulpwood			
		Michigan	Minnesota	Wisconsin	Other
Roundwood					
Northeastern	1,079	245	2	833	--
Northwestern	1,311	14	348	948	--
Central	681	*	*	681	--
Southwestern	61	--	*	60	--
Southeastern	42	1	--	41	--
Total	3,174	260	351	2,563	--
Residues	375	15	4	352	4
Total pulpwood	3,549	275	355	2,915	4

* Less than 500 standard cords, unpeeled.

[1] Includes Canada.

Table may not add due to rounding.

Table 5.--Pulpwood production from roundwood by Forest Survey Unit, county, and species group, Michigan, 2003

(In standard cords, unpeeled)

Forest Survey Unit and county	All species	Species group									
		Northern white-cedar	Balsam fir	Hemlock	Jack pine	Red pine	White pine	Spruce	Tamarack	Ash	Aspen
Eastern Upper Peninsula											
Alger	77,223	149	3,367	6,916	2,077	4,900	553	2,081	2,120	696	12,957
Chippewa	84,744	120	2,421	4,025	8,621	3,922	218	2,219	328	798	20,878
Delta	87,878	325	6,239	3,914	1,942	2,628	768	3,072	1,135	608	25,964
Luce	69,324	65	1,103	2,287	4,406	1,555	154	655	227	1,108	12,739
Mackinac	81,760	157	2,596	1,376	4,121	5,472	954	2,065	404	923	21,140
Menominee	91,134	349	6,874	4,345	1,816	3,180	825	4,596	1,349	763	32,168
Schoolcraft	110,488	188	3,186	2,170	3,914	3,531	444	3,140	656	1,671	23,621
Total	602,551	1,353	25,787	25,032	26,898	25,190	3,917	17,829	6,220	6,567	149,466
Western Upper Peninsula											
Baraga	116,848	186	3,876	10,174	890	1,028	440	3,086	651	1,348	22,550
Dickinson	124,785	287	5,705	2,261	3,073	3,187	679	6,530	1,560	771	57,377
Gogebic	102,519	39	1,982	4,351	270	761	93	1,956	233	2,823	19,126
Houghton	81,929	51	1,105	5,627	8,256	431	120	562	177	1,237	25,017
Iron	116,924	289	6,929	2,633	2,255	2,721	707	6,635	1,303	1,358	35,640
Keweenaw	52,126	63	1,059	987	288	326	148	779	218	1,059	7,432
Marquette	226,731	660	11,219	14,570	6,810	4,812	1,560	6,273	2,409	1,547	76,146
Ontonagon	131,323	82	1,527	5,771	459	453	193	1,330	285	3,136	42,617
Total	953,185	1,656	33,403	46,373	22,301	13,718	3,939	27,149	6,836	13,280	285,905
Northern Lower Peninsula											
Alcona	38,840	41	325	--	962	148	191	78	--	248	27,274
Alpena	25,813	99	1,264	--	581	178	4	459	--	335	15,516
Antrim	12,826	--	--	--	510	55	5	--	--	224	4,347
Arenac	19,894	--	--	--	892	23	--	--	--	231	10,848
Bay	2,063	--	--	--	33	5	--	--	--	30	1,123
Benzie	11,605	--	--	--	767	4	143	--	--	471	3,430
Charlevoix	19,990	--	--	--	360	20	3	--	--	508	6,301
Cheboygan	63,794	35	3,078	5	3,470	161	26	2,556	3	471	34,055
Clare	33,449	27	216	--	747	4	8	52	--	354	19,521
Crawford	27,345	--	--	--	8,277	104	82	--	--	85	8,684
Emmet	32,287	11	110	--	1,317	176	13	47	--	404	15,965
Gladwin	45,390	--	--	24	16,103	86	163	--	--	188	14,549
Grand Traverse	14,374	--	--	--	916	57	3	--	--	344	4,658
Iosco	17,473	--	45	485	2,820	389	25	--	3,007	209	6,328
Isabella	15,507	--	--	--	34	34	--	--	--	175	9,278
Kalkaska	43,607	1	8	3	6,427	440	529	3	2	383	16,954
Lake	17,477	--	--	--	1,913	182	--	--	--	225	7,839
Leelanau	7,950	--	--	--	118	--	119	--	--	379	1,320
Manistee	19,166	--	--	--	437	241	96	--	--	518	8,092
Mason	12,977	--	--	--	158	290	--	--	--	443	4,993
Mecosta	19,837	--	--	--	616	145	--	--	--	245	10,394

Midland	10,182	--	--	--	243	70	--	--	--	35	5,997
Missaukee	42,576	1	9	4	3,077	205	258	4	2	510	19,407
Montmorency	47,805	54	705	--	2,962	152	22	462	--	365	32,544
Newaygo	25,927	--	--	--	2,060	1,803	--	--	--	433	6,855
Oceana	23,125	--	--	--	1,582	184	--	--	--	425	8,548
Ogemaw	37,416	--	--	--	16,004	187	157	--	--	211	14,248
Osceola	24,419	--	--	--	389	26	--	--	--	509	12,551
Oscoda	16,208	25	224	23	1,589	310	12	62	10	42	10,522
Otsego	54,417	--	--	--	4,383	471	43	--	--	887	18,316
Presque Isle	42,189	100	1,078	3	3,036	113	25	605	1	521	24,530
Roscommon	26,632	--	--	--	5,499	211	14	--	--	68	14,593
Wexford	20,959	--	--	--	1,900	840	191	--	--	283	10,476
Total	873,518	392	7,061	547	90,183	7,313	2,132	4,327	3,024	10,760	410,057
Southern Lower Peninsula											
Allegan	12,029	--	--	--	--	--	--	--	--	1	1,368
Barry	86	--	--	--	--	--	--	--	--	--	10
Calhoun	1,437	--	--	--	--	--	--	--	--	--	162
Cass	3,131	--	--	--	--	--	--	--	--	--	353
Clinton	20	--	--	--	20	--	--	--	--	--	--
Genesee	294	--	--	--	--	--	--	--	--	11	33
Gratiot	155	--	--	--	--	--	--	--	--	*	35
Huron	818	--	--	--	--	--	--	--	--	--	451
Ingham	18	--	--	--	--	--	--	--	--	*	8
Ionia	1,088	--	--	--	317	--	--	--	--	2	458
Jackson	787	--	--	--	--	--	--	--	--	--	89
Kalamazoo	3,581	--	--	--	11	11	--	--	--	2	433
Kent	10,159	--	--	--	1,243	94	478	--	--	71	2,142
Montcalm	12,773	--	--	--	20	8	--	--	--	219	6,025
Muskegon	9,621	--	--	--	--	--	--	--	--	152	2,823
Ottawa	4,122	--	--	--	--	--	--	--	--	48	661
Saginaw	795	--	--	--	--	--	--	--	--	12	236
Sanilac	1,083	--	--	--	58	--	--	--	--	--	753
St. Clair	178	--	--	--	--	--	--	--	--	--	--
St. Joseph	871	--	--	--	--	--	--	--	--	--	98
Tuscola	2,324	--	--	--	50	26	--	--	--	--	1,383
Van Buren	2,636	--	--	--	--	--	--	--	--	1	311
Total	68,007	--	--	--	1,718	139	478	--	--	520	17,833
State total	2,497,261	3,402	66,251	71,953	141,100	46,360	10,466	49,306	16,080	31,127	863,261

(Table 5 continued on next page)

(Table 5 continued)

Forest Survey Unit and county	Species group											
	Balsam poplar	Basswood	Beech	White birch	Yellow birch	Elm	Hickory	Hard maple	Soft maple	Red oak	White oak	Other hardwoods
Eastern Upper Peninsula												
Alger	1,965	1,267	2,536	3,691	1,999	8	--	14,567	13,750	623	--	1,001
Chippewa	1,882	1,248	2,146	4,477	1,696	44	3	12,950	15,367	547	--	835
Delta	3,590	1,269	2,458	3,949	1,943	8	--	14,109	12,549	451	--	957
Luce	1,283	1,447	2,328	3,568	1,871	66	--	15,172	15,958	1,939	440	951
Mackinac	1,612	1,418	1,859	6,465	1,563	144	--	12,124	16,140	514	--	712
Menominee	1,748	3,037	1,823	3,443	1,550	82	--	11,400	10,526	537	--	723
Schoolcraft	2,201	2,055	3,640	5,824	2,956	82	--	23,505	22,833	2,775	658	1,439
Total	14,281	11,741	16,789	31,416	13,578	434	3	103,827	107,122	7,385	1,098	6,618
Western Upper Peninsula												
Baraga	3,096	2,125	4,124	7,879	3,394	130	--	25,975	23,435	801	--	1,658
Dickinson	2,794	5,572	2,016	4,309	1,664	32	--	13,114	12,391	646	--	816
Gogebic	99	2,747	2,710	6,190	3,382	390	--	25,127	27,111	1,389	107	1,634
Houghton	219	1,898	1,789	4,272	1,821	171	--	14,399	13,127	902	--	746
Iron	1,659	3,842	2,711	6,095	2,351	164	--	20,224	17,582	733	--	1,091
Keweenaw	42	1,692	2,183	2,540	2,132	--	--	14,826	14,157	1,317	--	880
Marquette	6,012	3,498	5,837	10,938	4,909	57	--	35,776	30,310	1,088	--	2,303
Ontonagon	707	5,053	2,083	6,161	5,170	201	--	31,337	19,908	3,887	--	964
Total	14,628	26,427	23,452	48,385	24,822	1,146	--	180,778	158,021	10,764	107	10,093
Northern Lower Peninsula												
Alcona	1,386	285	242	1,054	--	--	*	1,101	5,504	--	--	--
Alpena	515	329	335	1,417	1	1	1	1,103	3,675	--	--	--
Antrim	327	1,074	251	536	51	55	101	1,724	3,426	41	11	87
Arenac	96	136	225	692	5	6	10	813	5,207	456	123	131
Bay	5	12	26	20	1	1	2	92	697	--	--	17
Benzie	61	250	457	24	11	12	22	1,536	4,137	--	--	280
Charlevoix	447	1,657	771	881	64	70	128	3,514	5,249	5	11	--
Cheboygan	909	3,181	703	2,415	44	7	13	4,079	6,936	1,466	--	182
Clare	452	354	294	518	82	89	164	1,867	6,033	1,852	630	185
Crawford	147	122	141	400	26	28	51	1,063	4,822	2,796	511	7
Emmet	740	1,920	805	1,802	4	4	9	3,214	5,148	81	--	517
Gladwin	223	166	142	389	41	44	81	874	7,225	3,947	1,077	69
Grand Traverse	271	283	342	125	50	53	98	1,572	3,972	346	120	1,165
Iosco	248	13	206	363	--	--	--	443	1,659	1,214	--	19
Isabella	379	207	90	336	69	75	137	1,012	3,648	9	17	7
Kalkaska	858	1,552	395	907	157	169	311	3,319	9,342	1,420	426	3
Lake	152	139	193	181	28	30	55	911	2,586	1,983	949	113
Leelanau	134	178	320	53	24	26	48	1,256	3,371	314	85	204
Manistee	165	285	442	83	30	33	60	1,902	4,634	1,453	414	281
Mason	121	195	381	48	22	24	44	1,422	3,828	599	162	247
Mecosta	532	379	123	314	97	104	193	1,429	4,219	504	528	14
Midland	83	42	16	259	15	16	30	223	3,153	--	--	--
Missaukee	974	686	360	1,060	178	192	353	3,084	10,649	930	545	90
Montmorency	399	989	565	1,236	--	--	--	1,702	5,273	89	--	285
Newaygo	474	329	326	204	87	94	172	1,988	6,590	2,149	2,201	162
Oceana	555	349	287	230	101	109	201	1,979	5,724	1,547	1,178	124
Ogemaw	440	168	214	710	--	--	--	720	3,732	491	107	26

Osceola	332	328	433	430	60	65	120	1,994	6,074	473	380	255
Oscoda	262	67	47	466	--	--	--	291	1,999	257	--	--
Otsego	482	3,170	1,486	3,615	36	39	70	7,327	12,059	214	55	1,765
Presque Isle	836	756	520	2,561	--	--	--	1,957	5,342	158	--	47
Roscommon	--	39	75	243	--	--	--	272	3,814	1,708	41	52
Wexford	192	175	226	209	35	38	70	1,107	5,033	24	29	130
Total	13,198	19,817	11,440	23,782	1,317	1,381	2,546	56,890	164,760	26,524	9,600	6,465
Southern Lower Peninsula												
Allegan	2	1	*	1	*	*	1	4	3,872	3,257	3,521	--
Barry	--	--	--	--	--	--	--	--	28	23	25	--
Calhoun	--	--	--	--	--	--	--	--	463	390	422	--
Cass	--	--	--	--	--	--	--	--	1,008	850	919	--
Clinton	--	--	--	--	--	--	--	--	--	--	--	--
Genesee	--	4	10	10	--	--	--	85	133	--	--	7
Gratiot	*	1	--	--	--	--	--	2	117	--	--	--
Huron	--	--	--	57	--	--	--	--	310	--	--	--
Ingham	1	1	--	*	--	--	*	2	6	--	--	--
Ionia	--	1	2	--	--	--	--	7	248	41	11	1
Jackson	--	--	--	--	--	--	--	--	254	214	231	--
Kalamazoo	3	2	1	1	1	--	1	11	1,144	942	1,019	--
Kent	84	75	38	28	26	--	26	381	2,314	1,438	1,714	7
Montcalm	516	261	100	203	94	102	187	1,308	3,139	246	344	--
Muskegon	236	137	93	93	43	46	85	735	2,507	1,367	1,270	33
Ottawa	38	30	36	15	7	8	14	184	1,388	800	873	20
Saginaw	28	14	6	11	5	6	10	69	168	77	154	--
Sanilac	--	--	--	62	--	--	--	--	210	--	--	--
St. Clair	--	--	--	--	--	--	--	--	178	--	--	--
St. Joseph	--	--	--	--	--	--	--	--	281	237	256	--
Tuscola	--	--	--	33	--	--	--	--	832	--	--	--
Van Buren	2	1	*	1	*	*	1	5	848	704	761	--
Total	911	528	287	514	176	162	325	2,793	19,447	10,587	11,522	69
State total	43,018	58,512	51,968	104,097	39,894	3,124	2,873	344,287	449,350	55,260	22,328	23,245

* Less than 1/2 cord.

[1] Includes only those counties that supplied pulpwood in 2003.

Table may not add due to rounding.

Table 6.--Pulpwood production from roundwood by Forest Survey Unit, county, and species group, Minnesota, 2003

(In standard cords, unpeeled)

Forest Survey Unit and county	All species	Species group																		
		Balsam fir	Jack pine	Red pine	White pine	Spruce	Tama-rack	Ash	Aspen	Balsam poplar	Bass-wood	White birch	Yellow birch	Cotton-wood[2]	Elm	Hard maple	Soft maple	Red oak	White oak	Other hardwoods
Aspen-Birch																				
Carlton	61,295	3,315	709	1,316	5	3,711	3,206	775	35,277	652	990	5,482	--	--	102	794	4,807	33	--	121
Cook	29,619	1,344	580	449	16	4,993	5	17	18,468	16	22	3,572	--	--	1	5	128	--	--	1
Koochiching	365,516	29,287	8,289	1,033	85	67,718	14,784	210	188,703	32,498	166	20,455	--	--	11	1,599	666	--	--	13
Lake	94,901	7,115	6,142	4,719	120	11,765	774	253	37,283	518	470	13,268	--	--	195	789	11,256	--	--	232
St. Louis	627,654	52,198	15,455	3,857	267	61,573	18,671	2,348	352,092	21,891	3,341	68,918	--	--	353	5,600	20,542	91	36	420
Total	1,178,985	93,259	31,175	11,375	494	149,761	37,439	3,603	631,824	55,575	4,990	111,694	--	--	662	8,786	37,400	124	36	787
Northern Pine																				
Aitkin	188,779	26,278	518	1,067	28	15,663	6,510	1,135	109,307	1,977	1,950	11,089	14	16	264	1,160	11,489	--	--	314
Becker	51,850	809	1,698	702	--	169	320	5	43,681	1,309	81	2,734	--	288	--	29	24	--	--	--
Beltrami	199,086	6,286	12,215	1,225	--	4,650	1,597	577	144,080	17,104	1,054	9,117	--	--	19	117	1,022	--	--	23
Cass	139,237	1,735	4,731	3,828	*	3,932	1,237	897	97,403	3,573	622	15,801	7	--	83	384	4,905	--	--	98
Clearwater	69,525	1,057	586	71	--	376	171	85	59,213	1,373	495	5,971	--	--	*	31	96	--	--	*
Crow Wing	121,151	1,040	9,897	2,196	69	217	12	999	95,977	920	1,252	4,904	45	32	60	333	3,125	--	--	71
Hubbard	104,670	236	8,281	1,575	--	400	258	142	83,415	629	581	8,473	--	--	1	22	655	--	--	1
Itasca	318,706	32,303	7,187	6,712	57	35,084	6,298	834	180,305	14,168	1,003	25,049	--	--	176	1,102	8,220	--	--	209
Lake of the Woods	72,711	2,905	4,905	135	18	4,590	2,553	86	44,011	7,902	12	4,772	--	--	9	425	376	--	--	11
Mahnomen	11,677	5	113	12	--	86	115	--	10,595	335	38	359	--	--	--	20	--	--	--	--
Roseau	54,431	830	3,748	375	--	1,386	988	--	38,890	5,896	--	2,163	--	--	--	155	--	--	--	--
Wadena	18,001	283	2,084	715	--	13	546	--	14,057	84	--	214	--	--	--	--	5	--	--	--
Total	1,349,822	73,769	55,963	18,613	171	66,566	20,606	4,760	920,934	55,269	7,087	90,647	65	336	613	3,778	29,917	--	--	728
Central Hardwood																				
Anoka	713	--	--	--	--	53	--	--	171	--	115	171	--	--	--	72	131	--	--	--
Benton	1,695	--	*	218	15	--	--	41	1,188	2	83	15	--	9	--	51	73	--	--	--
Chisago	645	9	--	21	--	140	--	2	292	2	3	92	--	--	*	2	49	33	--	*
Douglas	259	--	--	--	--	147	--	--	112	--	--	--	--	--	--	--	--	--	--	--
Goodhue	108	10	--	--	--	--	--	5	--	--	--	5	--	--	--	29	24	24	10	--
Houston	224	--	--	--	--	--	--	10	--	--	--	10	--	--	--	68	56	56	23	--
Isanti	849	21	9	26	--	--	--	--	639	--	36	73	--	--	--	--	45	--	--	--
Kanabec	17,048	9	36	40	24	--	12	278	14,094	257	386	782	32	32	21	121	899	--	--	25
Mille Lacs	20,409	--	--	52	569	--	21	354	17,350	134	429	442	--	9	17	101	910	--	--	20
Morrison	18,133	--	1,492	954	81	--	34	197	14,583	96	183	255	35	51	--	72	98	--	--	--
Otter Tail	9,550	--	--	--	--	--	--	--	8,936	292	13	309	--	--	--	--	--	--	--	--
Pine	132,208	994	1,400	2,162	185	580	274	934	100,339	733	1,397	13,045	17	--	132	2,822	6,875	124	36	157
Sherburne	700	10	95	442	--	35	--	--	61	2	1	21	--	--	*	2	30	--	--	*
Stearns	67	--	36	30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Todd	10,085	12	--	--	--	104	--	--	9,545	154	160	109	--	--	--	--	--	--	--	--
Wabasha	974	--	21	953	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Washington	2,060	103	110	391	147	326	--	*	457	*	131	157	--	--	--	72	131	33	--	--
Winona	637	--	--	260	--	2	--	--	130	--	--	183	--	--	--	--	61	--	--	--
Wright	217	--	39	34	--	--	--	3	112	3	4	3	--	--	*	2	17	--	--	*
Total	216,580	1,170	3,238	5,585	1,021	1,388	342	1,824	168,010	1,676	2,942	15,671	84	100	171	3,415	9,398	271	70	204
Prairie																				
Clay	262	--	--	--	--	--	--	--	262	--	--	--	--	--	--	--	--	--	--	--
Kittson	21,198	16	187	--	--	133	228	--	19,286	910	--	400	--	--	--	39	--	--	--	--
Marshall	44,267	1	13	--	--	136	17	--	38,742	5,242	--	76	--	37	--	3	--	--	--	--
Norman	3,009	--	--	13	--	--	--	--	2,892	--	--	--	--	105	--	--	--	--	--	--
Pennington	5,369	--	--	--	--	--	--	--	5,363	--	--	--	--	6	--	--	--	--	--	--
Polk	7,066	--	--	--	--	174	--	--	6,511	137	14	155	--	76	--	--	--	--	--	--
Red Lake	3,126	255	463	--	--	--	--	--	1,979	49	--	9	--	371	--	--	--	--	--	--
Total	84,296	272	662	13	--	443	245	--	75,034	6,339	14	640	--	594	--	42	--	--	--	--
State total	2,829,684	168,470	91,038	35,586	1,686	218,157	58,632	10,187	1,795,802	118,859	15,033	218,652	149	1,031	1,446	16,021	76,715	395	106	1,719

* Less than 1/2 cord.

[1] Includes only those counties that supplied pulpwood in 2003.

[2] Includes hybid poplar.

Table may not add due to rounding.

Table 7.--Pulpwood production from roundwood by Forest Survey Unit, county, and species group, Wisconsin, 2003

(In standard cords, unpeeled)

Forest Survey Unit and county	All species	Species group									
		Northern white-cedar	Balsam fir	Hemlock	Jack pine	Red pine	White pine	Spruce	Tamarack	Ash	Aspen
Northeastern											
Florence	93,483	35	3,184	3,674	4,163	5,155	451	1,432	236	1,605	21,847
Forest	148,218	10	3,470	911	487	8,774	113	6,345	479	4,301	37,959
Langlade	173,732	--	4,797	113	535	3,057	262	5,007	563	6,962	39,751
Lincoln	160,901	--	4,369	155	2,131	3,473	873	3,053	2,567	6,297	71,110
Marinette	134,318	13	1,850	6,990	14,141	15,026	956	1,353	882	2,464	37,555
Menominee	48,882	1	313	10,666	613	2,497	2,006	86	3	1,740	11,185
Oconto	52,760	--	235	67	1,939	2,834	203	165	64	1,009	19,528
Oneida	130,339	--	3,931	111	6,896	7,272	818	5,962	2,630	3,607	43,883
Shawano	55,081	--	394	486	464	4,406	299	109	12	2,661	11,853
Vilas	81,608	1	2,772	77	9,903	7,456	1,824	2,173	348	2,306	25,074
Total	1,079,321	59	25,315	23,249	41,270	59,950	7,804	25,685	7,783	32,950	319,746
Northwestern											
Ashland	171,073	--	6,767	140	869	1,445	1,277	6,006	1,623	2,592	57,933
Barron	26,209	--	63	22	696	1,554	606	294	153	639	12,983
Bayfield	153,045	--	5,848	--	10,578	9,368	1,139	2,994	178	3,372	71,579
Burnett	57,657	--	476	--	7,538	3,411	78	178	--	379	23,434
Douglas	155,284	--	12,904	--	16,079	6,092	321	694	1,940	2,301	63,219
Iron	89,805	--	4,097	--	233	525	1,019	5,312	463	3,808	21,607
Polk	32,842	--	136	--	2,431	855	173	168	67	419	17,851
Price	122,304	--	7,401	903	424	1,433	569	6,845	2,469	4,709	41,346
Rusk	100,748	--	168	--	65	533	208	2,118	184	4,195	33,347
Sawyer	214,221	--	3,752	26	3,707	3,645	1,378	3,901	1,196	7,946	63,671
Taylor	68,221	--	1,658	10	43	1,292	68	964	635	3,029	26,372
Washburn	119,357	--	2,070	--	14,034	7,976	1,145	744	183	3,322	45,944
Total	1,310,768	--	45,340	1,101	56,697	38,129	7,979	30,218	9,091	36,712	479,286
Central											
Adams	69,733	--	--	--	20,291	22,860	3,480	19	150	661	8,061
Chippewa	49,386	--	34	--	948	2,850	564	134	52	1,269	22,276
Clark	69,840	--	--	38	2,095	1,592	808	150	--	1,674	36,723
Eau Claire	32,080	--	15	--	4,907	5,757	1,261	56	--	689	6,409
Jackson	86,331	--	--	--	19,023	10,928	4,813	114	22	1,695	14,379
Juneau	67,631	--	--	--	21,846	15,376	3,318	44	52	966	6,265
Marathon	78,600	--	409	1,819	1,068	5,938	1,210	1,113	28	2,601	31,936
Marquette	13,985	--	--	--	1,552	8,376	1,829	58	59	84	449
Monroe	22,936	--	--	--	4,897	5,111	1,631	131	99	449	2,085
Portage	53,465	--	239	278	7,876	14,141	4,582	373	561	849	11,419
Waupaca	29,744	--	18	39	156	8,506	1,210	506	108	683	9,033
Waushara	43,508	--	--	--	2,175	23,731	4,675	1,308	--	371	1,018
Wood	64,154	--	29	25	6,846	8,106	4,522	909	16	1,321	21,825
Total	681,394	--	744	2,198	93,681	133,273	33,905	4,915	1,147	13,311	171,877

Southwestern											
Buffalo	3,373	--	54	--	--	307	347	485	--	54	951
Crawford	1,334	--	--	--	--	217	240	10	--	34	170
Dunn	10,215	--	--	--	1,195	2,031	422	188	--	199	2,114
Grant	48	--	--	--	5	22	--	--	--	1	--
Iowa	4,500	--	--	--	63	1,978	1,265	83	--	43	254
La Crosse	3,232	--	--	--	169	1,618	491	82	--	31	350
Lafayette	649	--	--	--	--	148	488	13	--	--	--
Pepin	1,111	--	--	--	25	356	176	--	--	7	399
Pierce	254	--	--	--	--	39	17	--	--	3	147
Richland	3,606	--	--	--	50	2,042	463	--	--	27	549
Sauk	10,167	--	--	--	619	5,765	915	108	--	99	919
St. Croix	9,705	--	--	--	1,028	3,445	225	583	--	157	2,447
Trempealeau	7,613	--	26	--	91	3,067	1,197	354	--	91	749
Vernon	5,058	--	--	--	30	697	378	239	--	352	140
Total	60,866	--	80	--	3,274	21,732	6,624	2,146	--	1,099	9,191
Southeastern											
Brown	1,931	--	--	--	80	624	26	9	--	12	917
Calumet	209	--	--	--	--	10	3	--	13	12	13
Columbia	12,051	--	--	--	322	6,269	787	80	--	166	1,547
Dane	430	--	--	--	16	138	130	13	--	6	--
Dodge	39	--	--	--	--	26	--	--	--	--	--
Door	5,187	--	--	122	--	260	326	248	--	192	1,906
Fond Du Lac	3,334	--	--	--	51	1,079	1,103	729	--	18	91
Green	240	--	--	--	12	153	24	--	--	2	--
Green Lake	2,380	--	--	--	34	1,145	687	6	--	9	96
Jefferson	1,128	--	--	--	--	611	361	46	--	3	54
Kewaunee	1,384	--	--	--	--	535	25	28	--	36	364
Manitowoc	2,521	--	17	--	--	133	505	98	1,079	38	16
Milwaukee	10	--	--	--	--	--	--	--	--	1	--
Outagamie	4,153	--	--	--	--	358	82	69	--	304	431
Ozaukee	50	--	--	--	--	14	13	--	--	2	--
Rock	777	--	--	--	--	391	157	103	--	6	14
Sheboygan	1,660	--	--	--	--	265	58	--	--	7	1,126
Walworth	129	--	--	--	--	19	11	--	--	8	--
Washington	464	--	--	--	16	186	27	46	--	12	15
Waukesha	1,518	--	--	--	--	955	345	142	--	4	24
Winnebago	2,021	--	--	18	21	194	643	161	--	39	193
Total	41,618	--	17	139	551	13,366	5,315	1,779	1,092	879	6,804
State total	3,173,967	59	71,497	26,687	195,474	266,450	61,626	64,743	19,113	84,951	986,904

(Table 7 continued on next page)

(Table 7 continued)

Forest Survey Unit and county	Species group											
	Balsam poplar	Bass-wood	Beech	White birch	Yellow birch	Cotton-wood	Elm	Hard maple	Soft maple	Red oak	White oak	Other hardwoods
Northeastern												
Florence	30	3,740	2,675	4,580	2,362	--	181	17,371	18,113	1,523	60	1,065
Forest	31	7,082	2,708	12,558	2,963	--	849	28,519	25,092	4,189	339	1,041
Langlade	10	9,216	2,785	14,551	3,596	--	1,194	40,958	32,451	5,692	1,069	1,163
Lincoln	--	3,067	514	11,699	3,238	--	679	27,261	16,696	2,351	429	938
Marinette	260	5,676	1,787	6,824	1,976	--	518	17,064	15,741	2,259	286	696
Menominee	--	934	292	1,962	863	--	110	8,994	5,085	1,468	55	10
Oconto	218	2,228	1,177	2,855	1,108	--	174	8,766	8,770	884	67	471
Oneida	--	2,622	936	13,889	2,167	--	758	17,196	13,527	3,240	276	619
Shawano	2	560	160	3,871	695	--	291	13,196	8,854	5,132	1,551	85
Vilas	*	1,522	184	6,846	989	--	340	10,220	6,275	2,906	146	248
Total	552	36,649	13,218	79,634	19,958	--	5,094	189,543	150,604	29,645	4,278	6,335
Northwestern												
Ashland	863	3,747	30	7,647	438	--	1,758	21,200	51,584	2,632	909	1,612
Barron	16	745	1	1,327	86	--	82	2,065	2,326	2,131	416	5
Bayfield	1,007	7,871	81	13,249	886	--	338	9,346	10,554	3,498	797	363
Burnett	29	565	1	6,765	44	--	204	3,628	7,472	2,834	427	193
Douglas	659	2,864	2	19,159	304	--	608	9,047	16,146	2,205	356	385
Iron	104	1,455	348	7,953	2,230	--	664	18,653	18,111	1,858	482	884
Polk	4	664	1	1,767	138	--	129	1,840	2,218	3,716	255	8
Price	48	2,700	261	13,100	1,632	--	937	20,892	13,874	1,992	474	295
Rusk	36	3,743	83	11,356	1,051	456	1,288	18,524	14,640	6,809	1,827	117
Sawyer	290	5,875	99	20,512	1,472	--	1,695	33,895	39,930	15,165	5,489	577
Taylor	--	1,524	127	6,924	768	121	625	13,336	8,418	1,742	489	76
Washburn	73	4,230	3	8,572	296	--	466	8,431	14,466	5,924	1,275	203
Total	3,130	35,985	1,037	118,332	9,346	577	8,794	160,858	199,737	50,506	13,196	4,717
Central												
Adams	--	98	2	1,054	65	--	59	3,524	2,913	5,202	1,294	--
Chippewa	1	1,305	6	4,574	425	425	704	5,094	3,658	4,689	373	7
Clark	--	1,243	24	4,138	412	61	434	7,291	5,515	6,415	1,222	6
Eau Claire	--	349	4	1,967	220	--	192	2,670	2,133	4,941	501	9
Jackson	--	469	2	3,886	286	--	266	8,173	6,723	13,199	2,347	6
Juneau	--	80	--	1,288	50	--	48	5,436	4,515	6,420	1,928	--
Marathon	--	1,487	115	5,572	733	--	539	11,134	8,008	3,654	1,135	100
Marquette	--	6	2	108	12	--	4	459	368	477	142	--
Monroe	--	55	--	669	35	--	33	2,449	2,029	2,508	753	--
Portage	--	193	15	1,618	211	--	117	4,038	3,167	2,859	892	39
Waupaca	--	232	42	947	123	--	90	3,411	2,064	2,264	308	3
Waushara	--	13	2	423	19	--	7	2,152	1,773	5,124	714	3
Wood	--	423	7	2,890	252	--	245	6,151	4,974	4,261	1,347	5
Total	1	5,953	222	29,133	2,843	486	2,738	61,982	47,839	62,012	12,956	178

Southwestern												
Buffalo	--	15	--	365	8	--	5	274	246	188	73	--
Crawford	--	--	--	34	--	--	--	209	175	175	70	--
Dunn	1	110	--	612	63	--	61	738	621	1,771	91	*
Grant	--	--	--	1	--	--	--	6	5	5	2	--
Iowa	--	1	--	46	--	--	--	257	214	211	84	--
La Crosse	--	8	--	65	6	--	5	147	121	102	36	--
Lafayette	--	--	--	--	--	--	--	--	--	--	--	--
Pepin	--	12	--	33	3	--	3	25	34	35	1	--
Pierce	--	3	--	12	1	--	1	13	16	2	--	*
Richland	--	3	--	38	2	--	2	147	123	115	46	--
Sauk	--	21	*	181	13	--	13	504	415	458	136	--
St. Croix	4	172	--	366	34	--	32	347	406	439	19	--
Trempealeau	--	42	--	519	26	--	25	356	291	713	68	--
Vernon	--	1	34	14	1	--	1	2,142	995	24	10	--
Total	6	387	34	2,285	158	--	149	5,165	3,662	4,237	636	1
Southeastern												
Brown	72	45	*	26	5	--	2	54	35	23	1	--
Calumet	--	1	2	17	9	--	1	62	36	26	3	--
Columbia	--	79	--	472	46	--	46	657	538	901	141	--
Dane	--	1	--	9	--	--	--	40	33	31	13	--
Dodge	--	--	--	--	--	--	--	--	--	13	1	--
Door	13	89	8	522	73	--	53	742	516	100	19	--
Fond Du Lac	--	5	*	38	4	--	3	83	67	47	17	--
Green	--	--	--	2	--	--	--	16	13	13	5	--
Green Lake	--	--	1	10	6	--	--	48	31	297	5	3
Jefferson	--	2	--	11	1	--	1	16	13	6	2	--
Kewaunee	--	5	6	53	25	--	3	172	103	27	1	--
Manitowoc	--	2	2	46	6	--	1	213	168	142	55	--
Milwaukee	--	--	*	1	1	--	--	5	3	--	--	--
Outagamie	--	16	30	220	106	--	9	1,587	818	85	8	28
Ozaukee	--	--	*	2	1	--	--	11	6	--	--	--
Rock	--	1	--	8	--	--	--	32	28	26	10	--
Sheboygan	--	112	*	13	2	--	1	31	24	17	5	--
Walworth	--	--	2	8	6	--	--	43	24	8	--	--
Washington	--	--	2	12	8	--	--	65	39	34	3	--
Waukesha	--	--	1	4	3	--	--	20	11	9	--	--
Winnebago	--	3	1	51	10	--	2	197	152	276	57	3
Total	84	361	57	1,525	312	--	123	4,092	2,658	2,080	347	34
State total	3,773	79,335	14,569	230,909	32,616	1,063	16,897	421,639	404,501	148,481	31,414	11,265

* Less than 1/2 cord.

[1] Includes only those counties that supplied pulpwood in 2003.

Table may not add due to rounding.

Table 8.--Number of industrial pulp or particleboard plants in the Lake States by product form, species group used, and State, 2003

Product form and species group	Total Lake States	State		
		Michigan	Minnesota	Wisconsin
Roundwood				
Softwoods				
Northern white-cedar	2	2	0	0
Balsam fir	17	4	7	6
Hemlock	4	1	0	3
Jack pine	15	4	6	5
Red pine	16	4	6	6
White pine	11	3	3	5
Spruce	17	2	8	7
Tamarack	10	1	5	4
Total plants using softwoods [1]	23	4	10	9
Hardwoods				
Ash	23	7	6	10
Aspen	35	11	13	11
Balsam poplar	15	6	8	1
Basswood	19	9	5	5
Beech	12	8	0	4
White birch	29	8	10	11
Yellow birch	11	5	1	5
Cottonwood	3	0	2	1
Elm	6	2	1	3
Hickory	1	1	0	0
Hard maple	24	9	4	11
Soft maple	25	10	5	10
Red oak	13	7	0	6
White oak	7	3	0	4
Other hardwoods	8	5	1	2
Total plants using hardwoods [1]	42	12	13	17
Total plants using roundwood [1]	43	12	14	17
Residues				
Softwood	11	2	3	6
Hardwood	17	7	3	7
Total plants using residues [1]	19	7	4	8
Total plants	44	12	14	18

[1] Some plants use more than one species, so numbers in columns are not additive.

Table 9.--Average daily production of active wood pulp mills in the Lake States by State, company, location, and type of pulp produced, 2003

(In tons per 24 hours)

State and company	Location	Average daily production	Type of pulp produced					
			Sulfite	Kraft	Kraft/ groundwood	Groundwood/ mechanical	Semi-chemical	Thermo-mechanical
Michigan								
International Paper Co.	Quinnesec	1,250	--	1,250	--	--	--	--
Louisiana-Pacific Corp.	Alpena	250	--	--	--	250	--	--
MeadWestvaco Corp.	Escanaba	1,263	--	--	1,263	--	--	--
Menasha Packaging Co., LLC	Otsego	660	--	--	--	--	660	--
Packaging Corp. Of America	Manistee	361	--	--	--	--	361	--
SD Warren(DBA) Sappi Fine Paper	Muskegon	340	--	340	--	--	--	--
Smurfit-Stone Container Corp.	Ontonagon	751	--	--	--	--	751	--
Total	7 mills	4,875	--	1,590	1,263	250	1,772	--
Minnesota								
Boise Cascade	International Falls	1,040	--	1,040	--	--	--	--
Certainteed Corporation	Shakopee	310	--	--	--	310	--	--
Georgia-Pacific Corp.	Duluth	210	--	--	--	--	--	210
International Bildrite, Inc.	International Falls	100	--	--	--	100	--	--
International Paper	Sartell	400	--	--	--	--	--	400
Sappi Fine Papers, LLC	Cloquet	1,269	--	1,269	--	--	--	--
Stora Enso North America	Proctor	325	--	--	--	325	--	--
UPM - Blandin	Grand Rapids	410	--	--	--	410	--	--
Total	8 mills	4,064	--	2,309	--	1,145	--	610
Wisconsin								
Domtar Industries, Inc.	Nekoosa	495	--	495	--	--	--	--
Domtar Industries, Inc.	Port Edwards	255	255	--	--	--	--	--
Fraser Papers, Inc.	Park Falls	170	170	--	--	--	--	--
Georgia-Pacific Corp.	Phillips	90	--	--	--	90	--	--
International Paper Co.	Kaukauna	450	--	450	--	--	--	--
Mule Hide Manufacturing Co.	Cornell	220	--	--	--	220	--	--
Packaging Corp. Of America	Tomahawk	1,378	--	--	--	--	1,378	--
Stora Enso North America	Biron	400	--	--	--	--	--	400
Stora Enso North America	Niagara	250	--	--	--	250	--	--
Stora Enso North America	Stevens Point	200	--	--	--	200	--	--
Stora Enso North America	Wisconsin Rapids	1,200	--	1,200	--	--	--	--
Wausau-Mosinee Paper Corp.	Brokaw	258	258	--	--	--	--	--
Wausau-Mosinee Paper Corp.	Mosinee	275	--	275	--	--	--	--
Weyerhaeuser Co.	Rothschild	160	160	--	--	--	--	--
Total	14 mills	5,801	843	2,420	--	760	1,378	400
Lake States total	29 mills	14,740	843	6,319	1,263	2,155	3,150	1,010

Table 10.--Annual production of active particleboard and panel mills in the Lake States by State, company, location, and product produced, 2003

(In million square feet 3/4-inch basis)

State and company	Location	Product produced	Annual production
Michigan			
GFP Strandwood Corp.	Hancock	Engineered wood products	100
Georgia-Pacific Corp.	Gaylord	Particleboard	198
Louisiana-Pacific Corp.	Newberry	Oriented strand board	72
Louisiana-Pacific Corp.	Sagola	Oriented strand board	179
Weyerhaeuser Co.	Grayling	Oriented strand board	250
Total	5 mills		799
Minnesota			
Louisiana-Pacific Corp.	Two Harbors	Oriented strand board	67
Northwood Panelboard Co.	Solway	Oriented strand board	218
Potlatch Corp.	Bemidji	Oriented strand board	265
Potlatch Corp.	Cook	Oriented strand board	207
Potlatch Corp.	Grand Rapids	Oriented strand board	167
Trus Joist, A Weyerhaeuser Co.	Deerwood	Engineered wood products	n/a
Total	6 mills		924
Wisconsin			
Louisiana-Pacific Corp.	Hayward	Oriented strand board	250
Louisiana-Pacific Corp.	Tomahawk	Oriented strand board	64
Marshfield Doorsystems	Marshfield	Particleboard	79
Rodman Industries	Marinette	Particleboard	9
Total	4 mills		402
Lake States total	15 mills		2,125

Table 11.--Production and imports of pulpwood, Central States, 2003

(In standard cords, unpeeled)

Product form, species group, and destination	Production by State				Regional total	Imports		Total imports	Total receipts
	Illinois	Indiana	Iowa	Missouri		Lake States	Other U.S.		
Roundwood									
Softwoods									
Lake States	1,460	--	155	--	1,615	--	--	--	--
Southern States	1,464	--	--	2,406	3,870	--	--	--	--
Total	2,924	--	155	2,406	5,485	--	--	--	--
Soft hardwoods [2]									
Central States	1,753	5,844	1,690	4,909	14,196	--	--	--	14,196
Southern States	6,659	2,324	--	8,214	17,197	--	--	--	--
Total	8,412	8,168	1,690	13,123	31,393	--	--	--	14,196
Hard hardwoods [3]									
Central States	2,554	8,510	3,187	538	14,790	--	--	--	14,790
Southern States	17,319	6,896	--	74,496	98,711	--	--	--	--
Total	19,873	15,406	3,187	75,034	113,501	--	--	--	14,790
Total all roundwood									
Central States	4,307	14,354	4,878	5,448	28,986	--	--	--	28,986
Lake States	1,460	--	155	--	1,615	--	--	--	--
Southern States	25,443	9,220	--	85,115	119,778	--	--	--	--
Total	31,210	23,574	5,033	90,563	150,380	--	--	--	28,986
Residues									
Softwoods									
Southern States	--	--	--	1,860	1,860	--	--	--	--
Total	--	--	--	1,860	1,860	--	--	--	--
Hardwoods									
Central States	5,504	38,650	17,975	13,071	75,202	3,833	--	3,833	79,034
Lake States	--	8,786	1,776	--	10,562	--	--	--	--
Northeastern States	--	4,900	--	--	4,900	--	--	--	--
Southern States	7,699	78,229	--	133,569	219,498	--	--	--	--
Total	13,203	130,565	19,751	146,641	310,161	3,833	--	3,833	79,034
Total all residues									
Central States	5,504	38,650	17,975	13,071	75,202	3,833	--	29,433	79,034
Lake States	--	8,786	1,776	--	10,562	--	--	--	--
Northeastern States	--	4,900	--	--	4,900	--	--	--	--
Southern States	7,699	78,229	--	135,429	221,358	--	--	--	--
Total	13,203	130,565	19,751	148,501	312,021	3,833	--	29,433	79,034
Total all wood material									
Central States	9,811	53,005	22,853	18,519	104,188	3,833	--	29,433	108,021
Lake States	1,460	8,786	1,931	--	12,177	--	--	--	--
Northeastern States	--	4,900	--	--	4,900	--	--	--	--
Southern States	33,142	87,449	--	220,545	341,136	--	--	--	--
Total	44,413	154,139	24,784	239,064	462,400	3,833	--	29,433	108,021

[1] Vertical columns of figures under the box heading "Production by State" present the amount of roundwood cut or residue generated in each State.

[2] Hardwood species with an average specific gravity of 0.50 or less.

[3] Hardwood species with an average specific gravity greater than 0.50.

Table may not add due to rounding.

Table 12.--Central States pulpwood production by product form and species group, 1999-2003

(In standard cords, unpeeled)

Product form and species group	1999	2000	2001	2002	2003
Roundwood					
Softwoods	10,283	7,643	2,110	3,432	5,485
Soft hardwoods [1]	46,232	64,036	50,939	25,783	31,393
Hard hardwoods [2]	141,997	165,994	113,062	121,600	113,501
Total	198,511	237,673	166,111	150,815	150,380
Residues					
Softwood	19,773	12,849	117	1,860	1,860
Hardwood	247,244	269,603	302,510	274,219	310,161
Total	267,017	282,452	302,627	276,079	312,021
Total all wood material	465,528	520,125	468,738	426,895	462,400

[1] Hardwood species with an average specific gravity of 0.50 or less.

[2] Hardwood species with an average specific gravity greater than 0.50.

Table may not add due to rounding.

Table 13.--Central States pulpwood production by State and destination, 1999-2003

(In thousand standard cords, unpeeled)

Year	Illinois			Indiana			Iowa			Missouri		
		Destination			Destination			Destination			Destination	
	Total	Central States	Other States	Total	Central States	Other States	Total	Central States	Other States	Total	Central States	Other States
1999	79	22	58	176	73	102	33	29	4	177	12	166
2000	92	32	60	168	70	98	48	46	1	212	17	195
2001	75	22	53	160	67	93	44	43	1	190	14	175
2002	59	9	50	135	54	82	30	29	1	202	14	188
2003	44	10	35	154	53	101	25	23	2	239	19	221
5-year average	70	19	51	159	63	95	36	34	2	204	15	189

Table may not add due to rounding.

Table 14.--Average daily production of active wood pulp mills in the Central States by company, location, and type of pulp produced, 2003

(In tons per 24 hours)

Company	Location	Average daily production	Type of pulp produced		
			Groundwood/ mechanical	Semi-chemical	Thermo-mechanical
International Paper Co.	Terre Haute, Indiana	250	--	250	--
Box USA	Fort Madison, Iowa	158	--	158	--
Jeld-Wen Fiber Of Iowa	Dubuque, Iowa	75	75	--	--
Huebert Brothers Products, LLC	Booneville, Missouri	80	--	--	80
Central States total	4 mills	563	75	408	80

Piva, Ronald J.

2005. **Pulpwood production in the North-Central Region, 2003.** Resour. Bull. NC-251. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. 56 p.

Discusses 2003 production and receipts in the Lake, Central, and Plains States. Shows Michigan, Minnesota, and Wisconsin production by species for each county and compares production by Forest Survey Unit with that of previous years. Presents production data for Illinois, Indiana, Iowa, and Missouri by species group and product form. Includes 2003 production for the Plains States by species group and product form.

KEY WORDS: Roundwood, whole-tree chips, residue, pulpwood, particleboard, Michigan, Minnesota, Wisconsin, Illinois, Indiana, Iowa, Missouri, Plains States.

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